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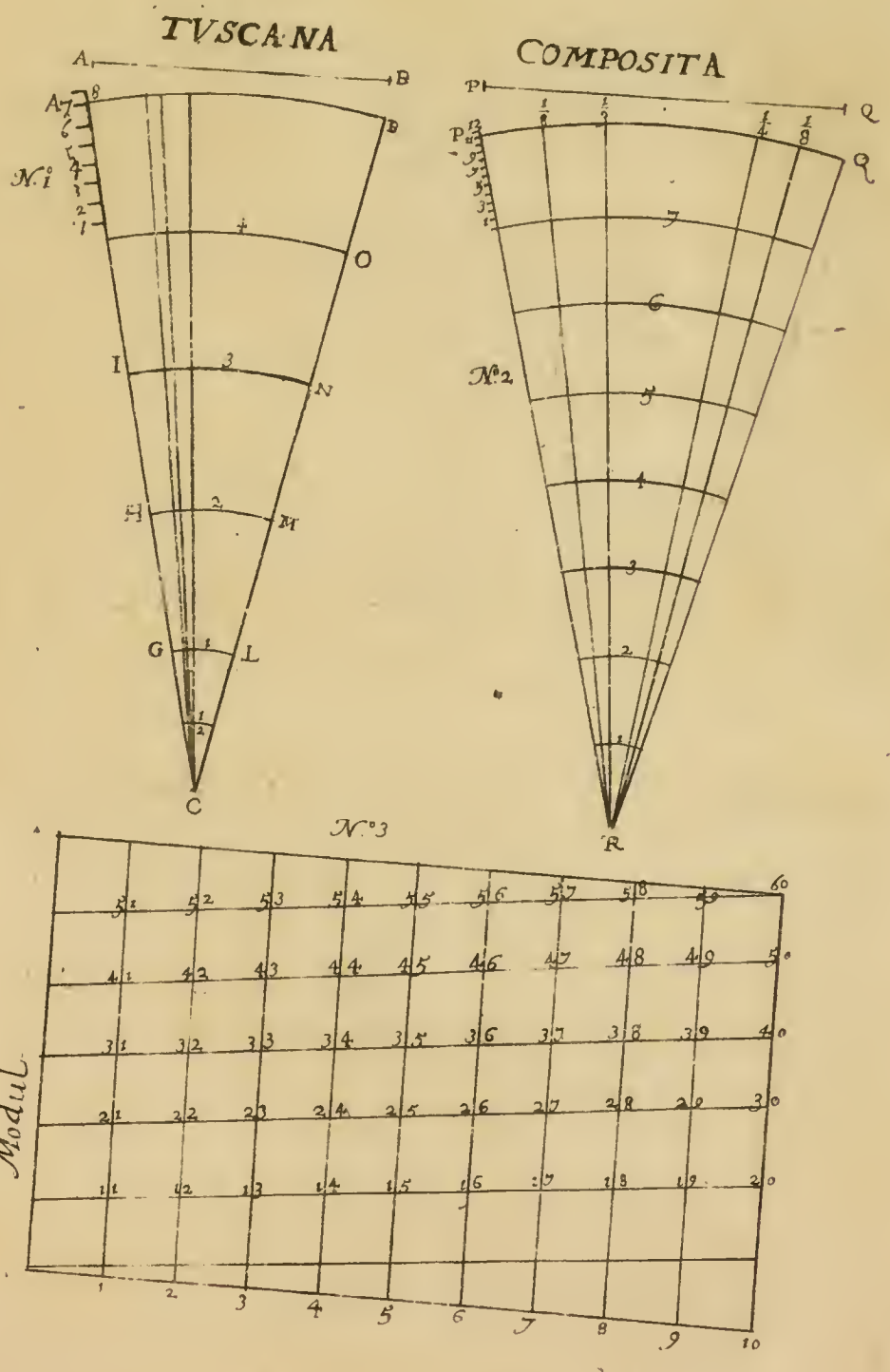
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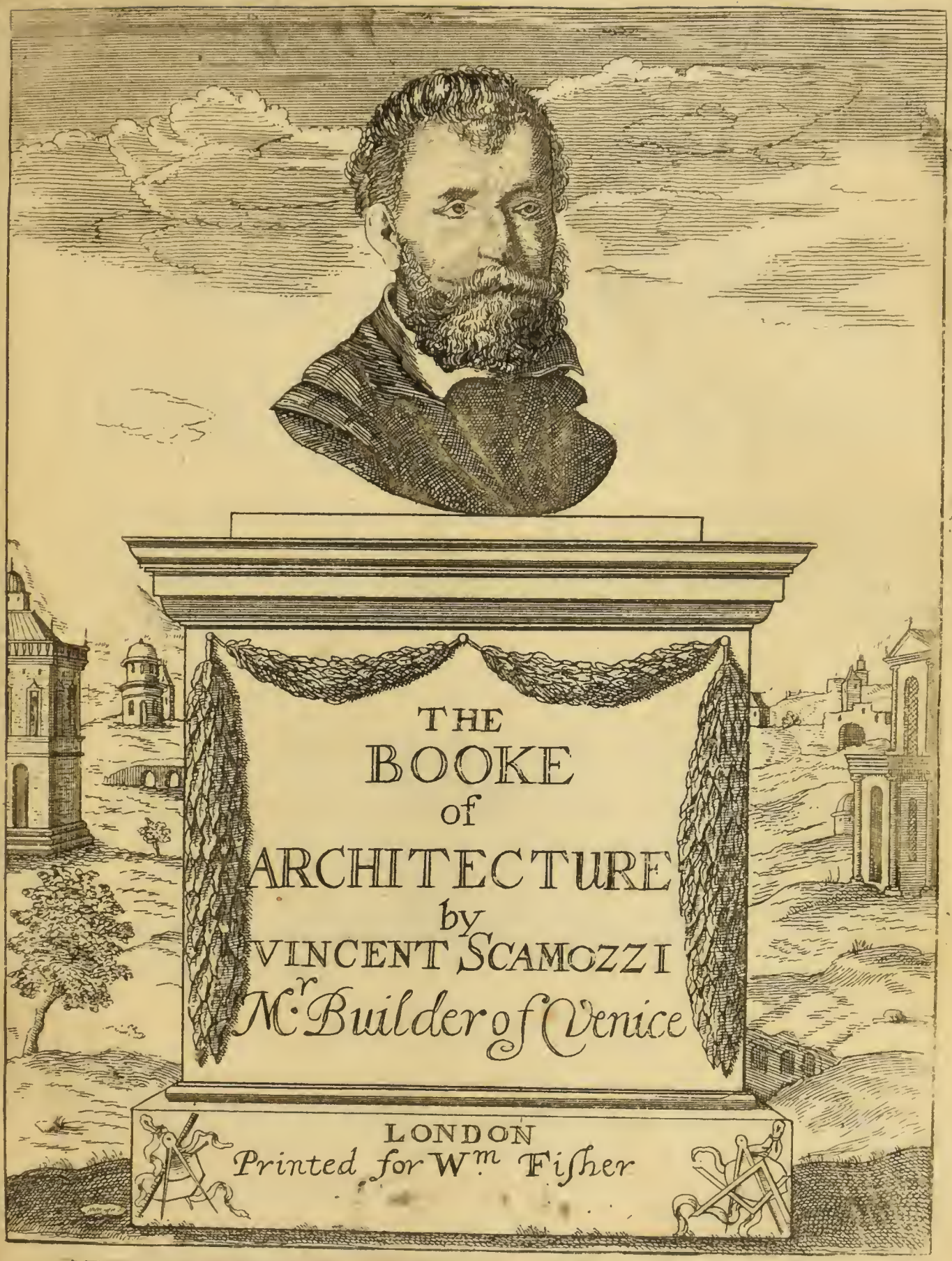
THE
BOOKE
of
ARCHITECTURE
by
VINCENT SCAMOZZI
r
M. Builder of Venice
LONDON
Printed for Wm Fisher

THE

Mirror of Architecture:

OR THE

GROUND-RULES

OF THE

Art of Building,

Exactly laid down by

VINCENT SCAMOZZI

Master-Builder of VENICE.

Reviewed and inlarged with the Addition of a Diagonal Scale being very useful for dividing the Author his given Parts into Minutes, whereby the principal Points of Architecture are easily and plainly demonstrated for the Benefit of all Lovers and Ingenious Practitioners in the said Art.

By *Joachim Schuym* of *Amsterdam.*

Translated out of *Dutch* by *W. F.*

Hereunto is added the Description and Use of an Ordinary Joynt-Rule fitted with Lines for the ready finding the Lengths and Angles of Rafters, and Hips and Collar-Beams, in any Square or Bevelling Roof at any Pitch, and the ready drawing the Architrave, Frize, and Cornice in any Order. With other useful Conclusions by the said Rule.

By *John Browne.*

The third Edition, with Addition of Stair-Cases and Chimney-Pieces.

London: Printed for *W. Fisher*, and *R. Mount*, at the Postern-Gate on *Tower-hill*, *T. Passenger* at the Three Bibles on *London*-Bridge, and *E. Smith* at the Bible in the *South Portico* of the *Royal Exchange.* 1687.

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TO THE

LOVERS

OF

ARCHITECTURE.

Reader,

AS in all things Order is to be obſerved that we may avoid Confuſion, or elſe they will be a Chaos, as the Poets fancy; So eſpecially in this excellent Art of Architecture it is requiſite that every part and member have its right Order and due Proportion: And there having been many Maſters who have with great Care and Induſtry brought this Art to a

great Perfection, among whom this famous Maſter *Vincent Scamozzi*, Chief Builder of the Magnificent City of *Venice*, deſerves to be placed in the firſt and chiefeſt rank by the conſent of all Judicious Artiſts. Therefore for the benefit of our own Nation, and that it may be made moſt uſeful for all Artificers in Building, and Lovers and Practitioners in this moſt uſeful Art; who are or may be employed in Royal and Magnificent Structures. The larger Book is here reduced into a ſmaller Volume, and the Author his given Parts divided into Minutes; whereby the Principal Rules of Architecture are made plain to ordinary Capacities by *Joachym Schuym* an Ingenious Artiſt. And for your better underſtanding, take notice, that by Model is ſignified the Meaſure of the whole Diameter

of

of the Column: as for example: Let the Diameter be 18, 16, or 12 Inches, which ſhall be the Model divided into 60 Equal Parts or Minutes, (as you may ſee in the Diagonal Scale enſuing) by uſing which Meaſure all the Parts of the ſaid Column ſhall be Proportionable: And this dividing of the Column into 60 Equal Parts or Minutes ſhall be uſed to all the Columns. Alſo here is added the Deſcription and Uſe of an Ordinary Joynt-Rule fitted with Lines for the ready finding the Lengths and Angles of Rafters and Hips and Collar-Beams in any Square or Bevelling Roofs at any Pitch, and the ready drawing the Architrave, Frieze and Cornice in any Order, with other uſeful Concluſions by the ſaid Rule.

In this Edition, that the Book may be the more compleat, you have a

Trea-

Treatiſe containing the Ground-Rules of Architecture, being the Subſtance of what was writ of it by the Learned and Judicious Sir *Henry Wotton* in his Elements of Architecture, with the Figures of the *Roman* and *Corinthian* Stately Capitals, with Stair-Caſes and Chimney-Pieces.

Accept favourably, and judge impartially.

Farewel.

The

The Deſcription of the Scale, and its Uſe in dividing of the Parts in the Column eaſily found out, agreeing with the Meaſure of the Author.

No. I.

THE height of the uppermoſt Line A B is taken from the *Tuſcan* Cornice (in the ſixth Plate) and is divided into $4\frac{7}{8}$ parts : draw a Line ſtraight up ſo long as you will, as C A, and divide into 5 equal parts, then divide the uppermoſt fifth part into 8 parts, and take 7 of them, and ſetting one foot of the Compaſſes in the Point C, and the other foot to the uppermoſt ſeventh part, draw an Arch of a Circle from that ſeventh part ſo far as the Line A B may be ſet on it from A to B, and draw a Line ſloping from B to C, and draw every fifth part with the Compaſſes between the two Lines A C and B C; the undermoſt drawn Line G L is 1 part, H M 2 parts, I N 3 parts, K O 4 parts of the Line A B divided into $4\frac{7}{8}$ parts: then to divide the parts ſo, you muſt ſee what uſe you have thereof in your Cornice, and divide the Line A B into ſo many parts as there is occaſion, as in 3 parts: ſo draw a Line $\frac{1}{3}$ from the point C, and into 4 parts, and draw a Line $\frac{1}{4}$ from the point C, and then into 5, and draw a Line $\frac{1}{5}$ from the point C. Then to ſtrike out the ſmall members of the Cornice, ſet the Compaſſes from H to the Line $\frac{1}{5}$, the which will give $\frac{2}{5}$ parts of the Line A B, then follows $\frac{1}{6}$: therefore ſet your Compaſſes on F and the Line $\frac{1}{3}$, then have you the $\frac{1}{6}$ part, next follows the part 1 : therefore ſet your Compaſſes from G to L, the which is 1 part: then ſet the Compaſſes on G and the Line $\frac{1}{5}$, the which is then $\frac{1}{5}$ parts, then ſet your Compaſſes on F and $\frac{1}{4}$, and add that to G L, and it makes together $1\frac{1}{8}$ parts, then follow two parts $\frac{1}{5}$, then ſet the Compaſſes from I to the Line $\frac{1}{4}$, the which is $\frac{3}{4}$ parts, then on F and $\frac{1}{3}$, which is $\frac{1}{6}$ parts, then on H and $\frac{1}{5}$, which

is

is $\frac{2}{3}$, and on G and the Line $\frac{1}{4}$, which is $\frac{1}{4}$, and do the like with every member of the Cornice and the Base, as you may see plainly in the sixth Figure.

No. II.

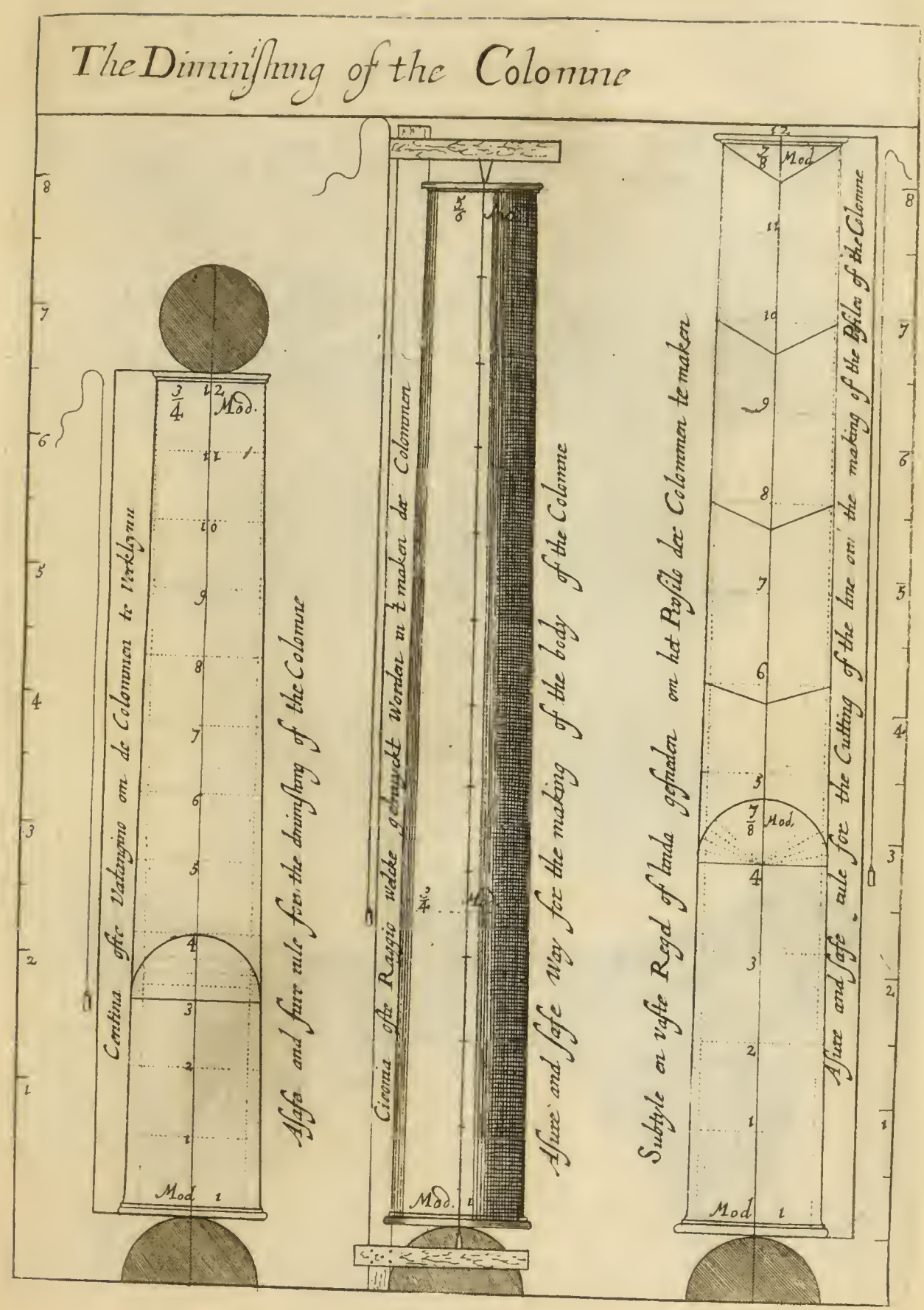
The Slope Line P Q R is upon the Cornice of Composita, where is to be divided into 7 and $\frac{1}{12}$ parts, and one half twelfth part $7\frac{1}{12} : \frac{1}{2}$ and may be drawn after the same manner, as with the Dorick, Ionick and Corinthian, as you see plainly in the 24th Figure.

No. III.

The Author gives well the dividing the members in general of the Ornament, Impost and Arch with the Base and Cimacia, but not so plain in particular how much every member must be. There have been several Lovers of the Art have endeavoured to find out the dividing of the minutes. So I thought necessary to put the minutes to it, and of the same to make a Scale. And for to make the Scale right, divide your Model into 6 parts on one side, and divide the other side into 10 parts, and so draw your Lines Diagonal ways, after the manner of the draught of the Diagonal Scale in the next leaf ensuing. So is your Scale made by which all the members are easily and rightly divided.

The

The Diminishing of the Colonne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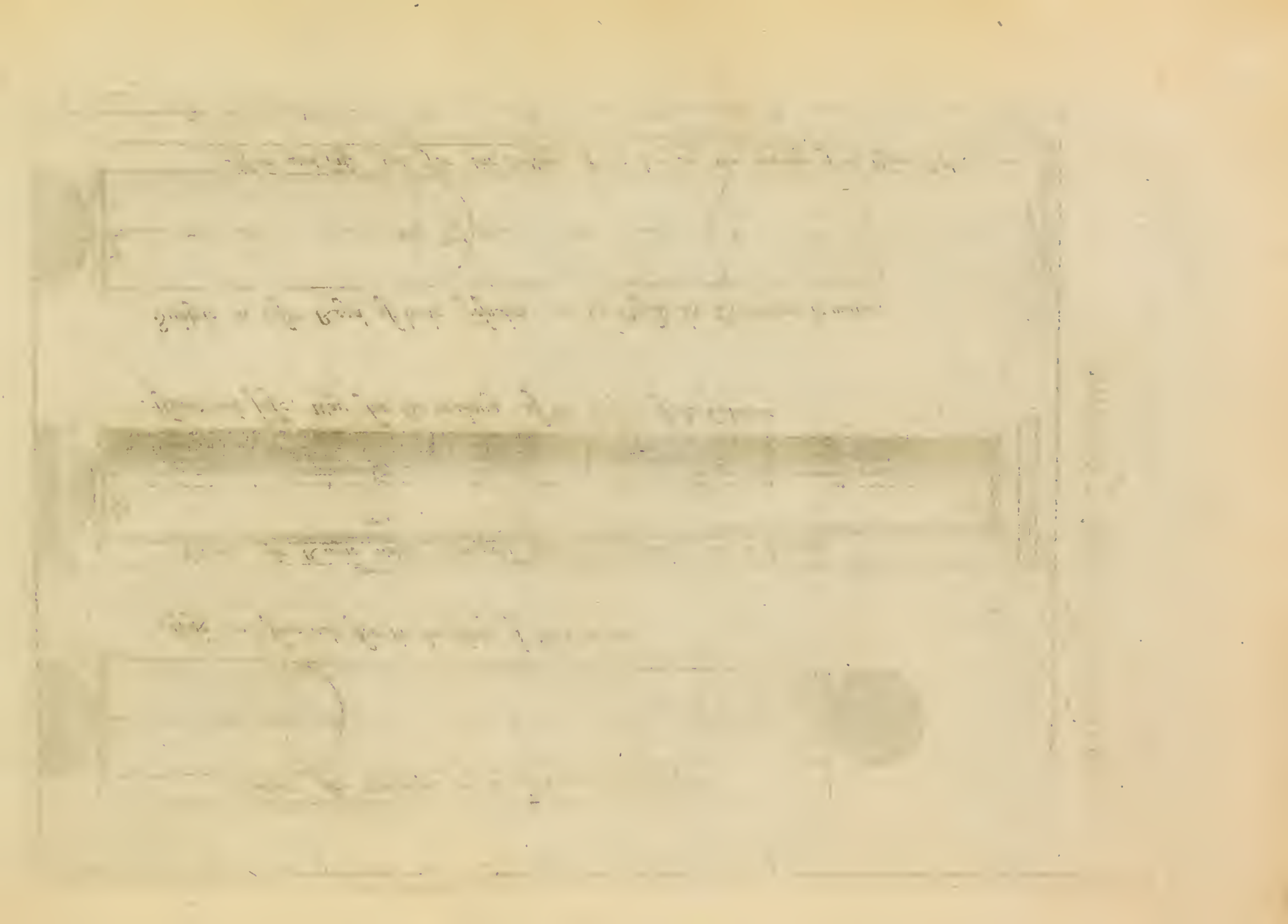
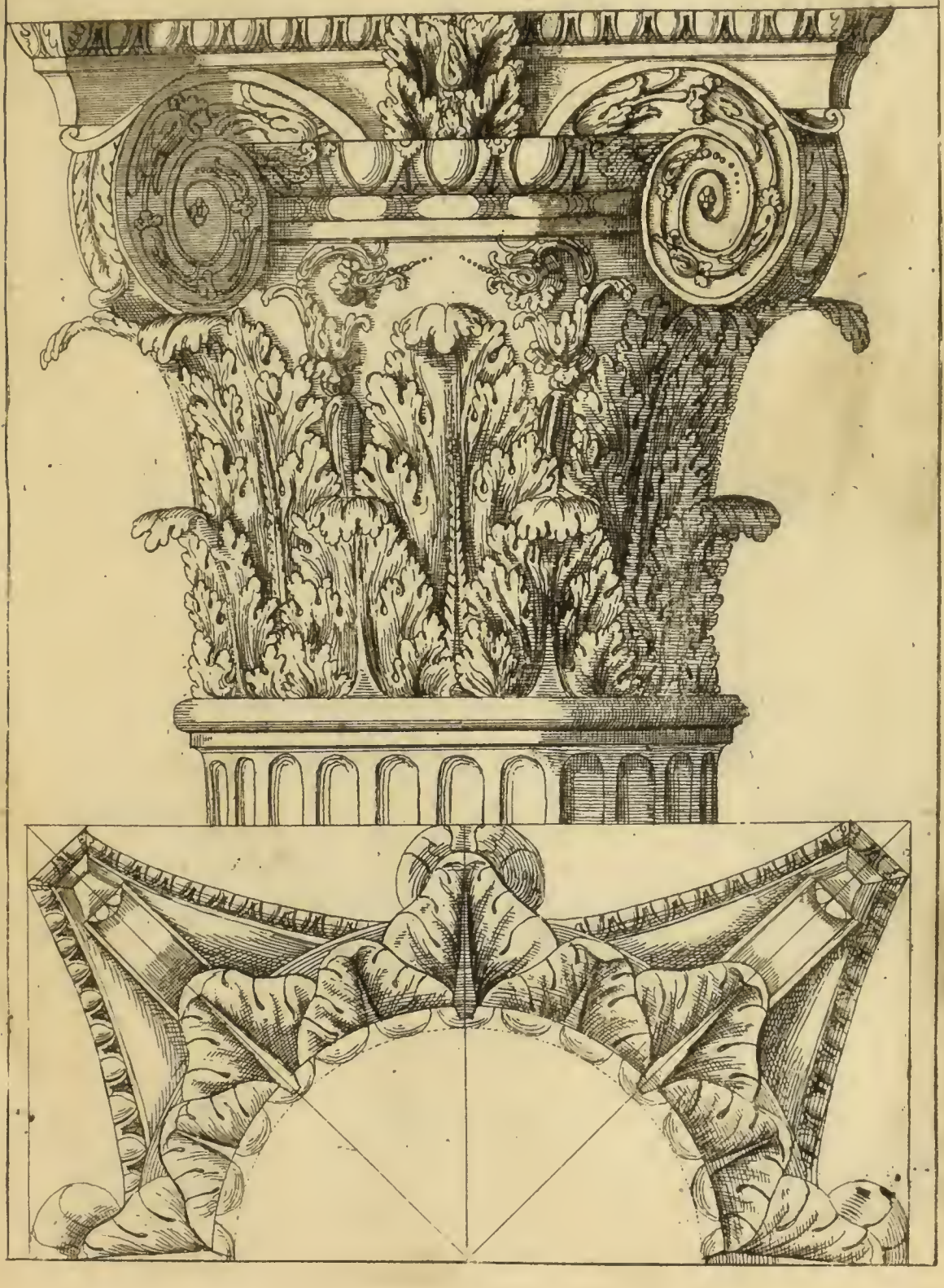
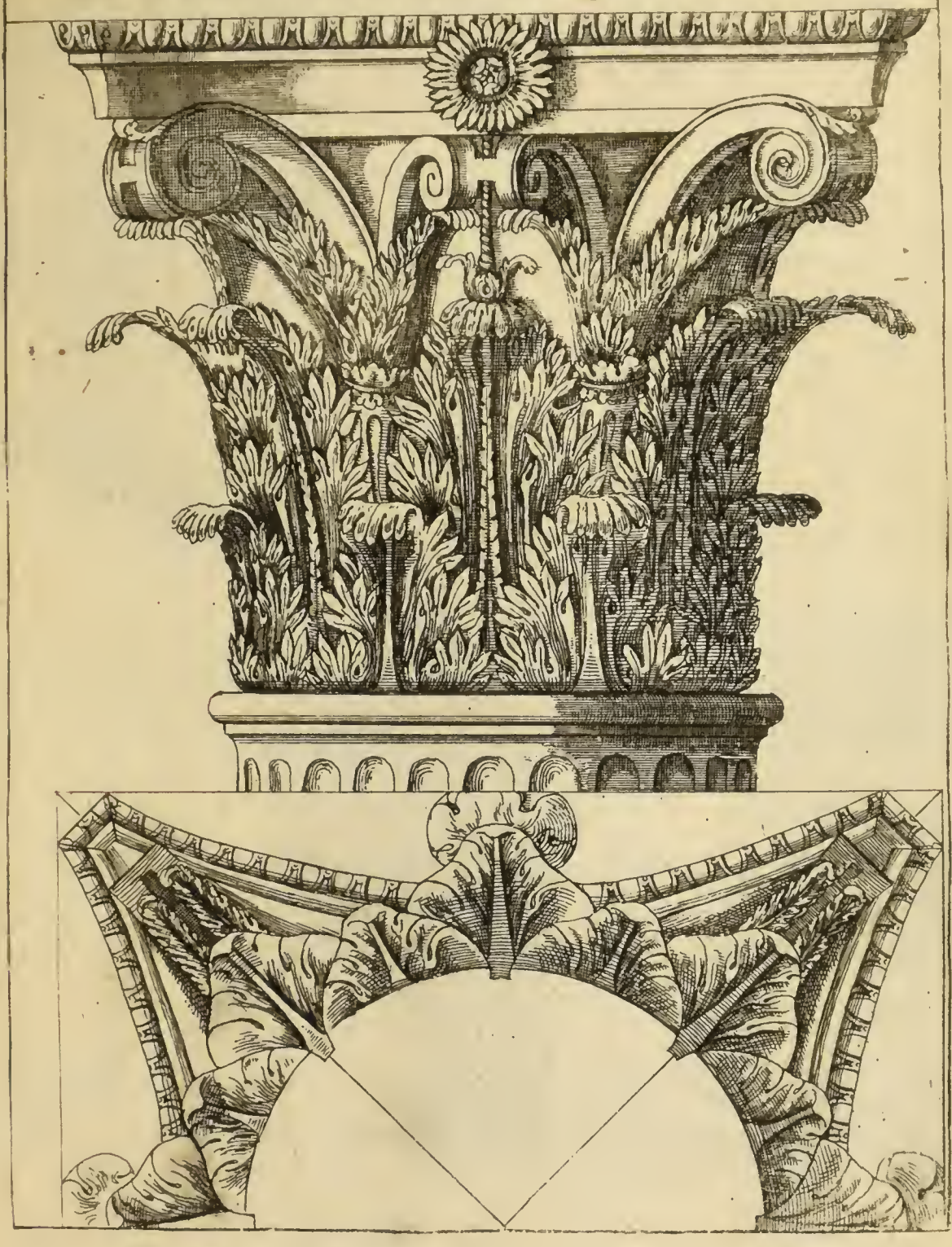
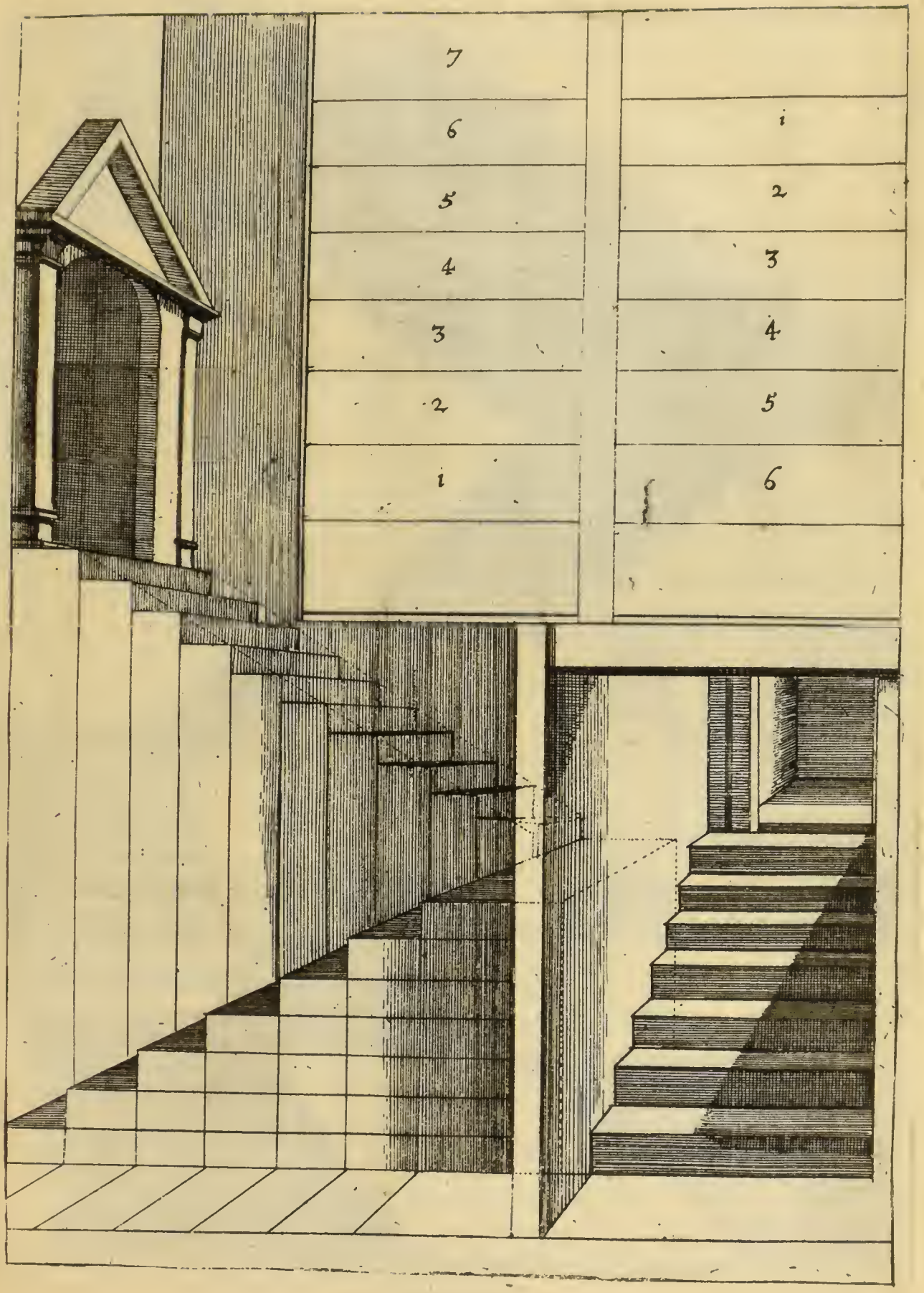


The Roman Capital.



The Corinthian Capital.

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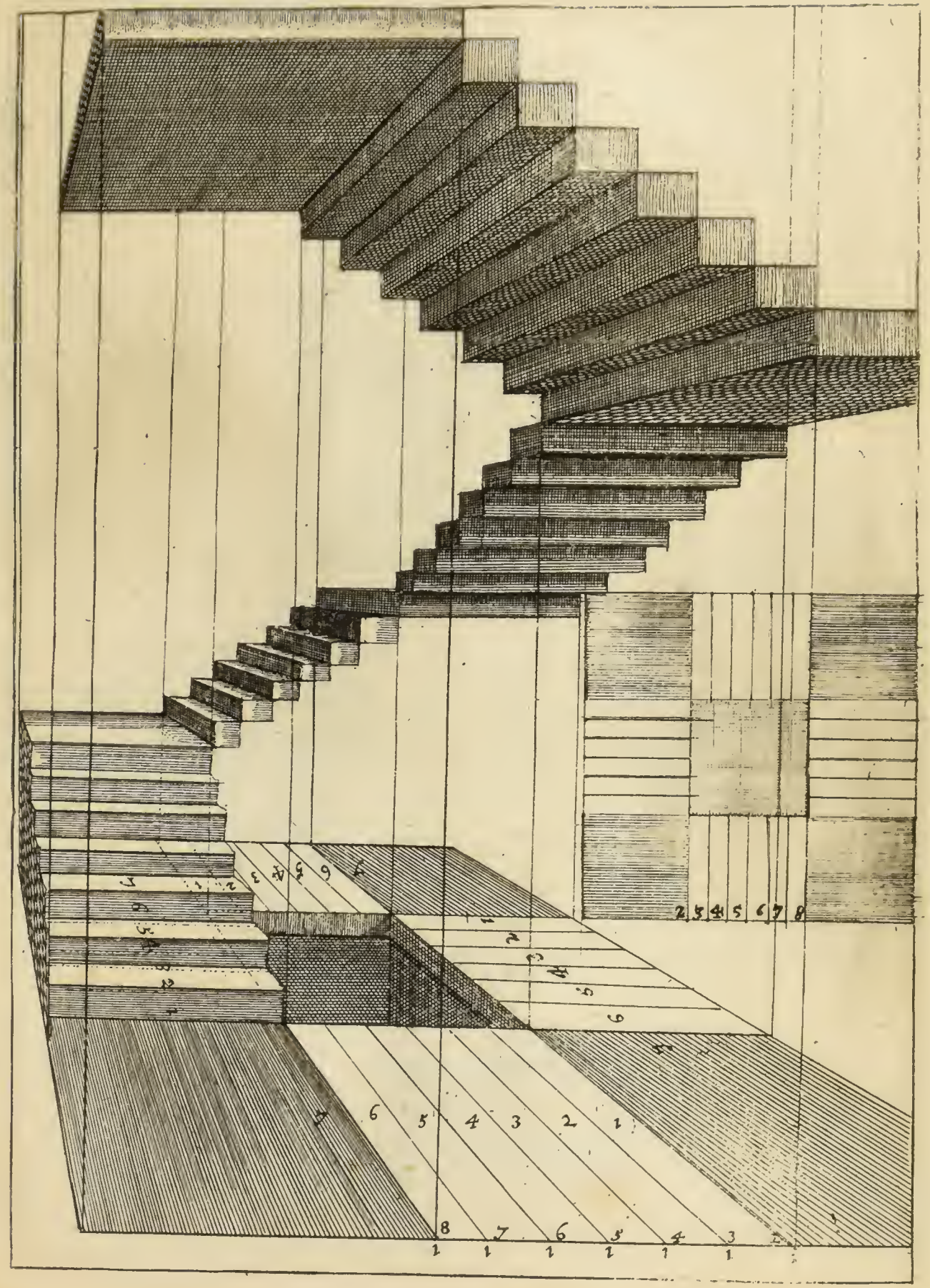
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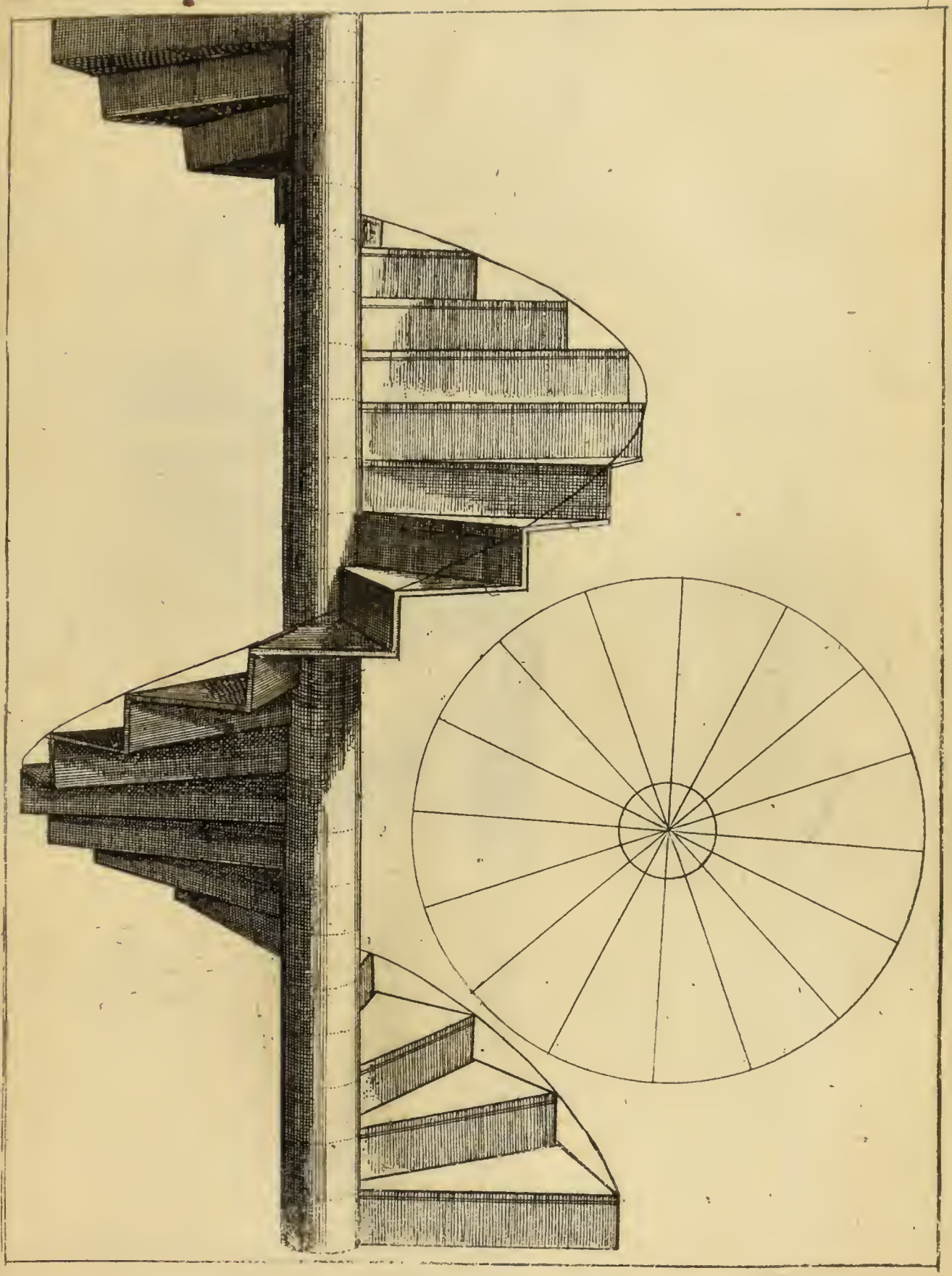

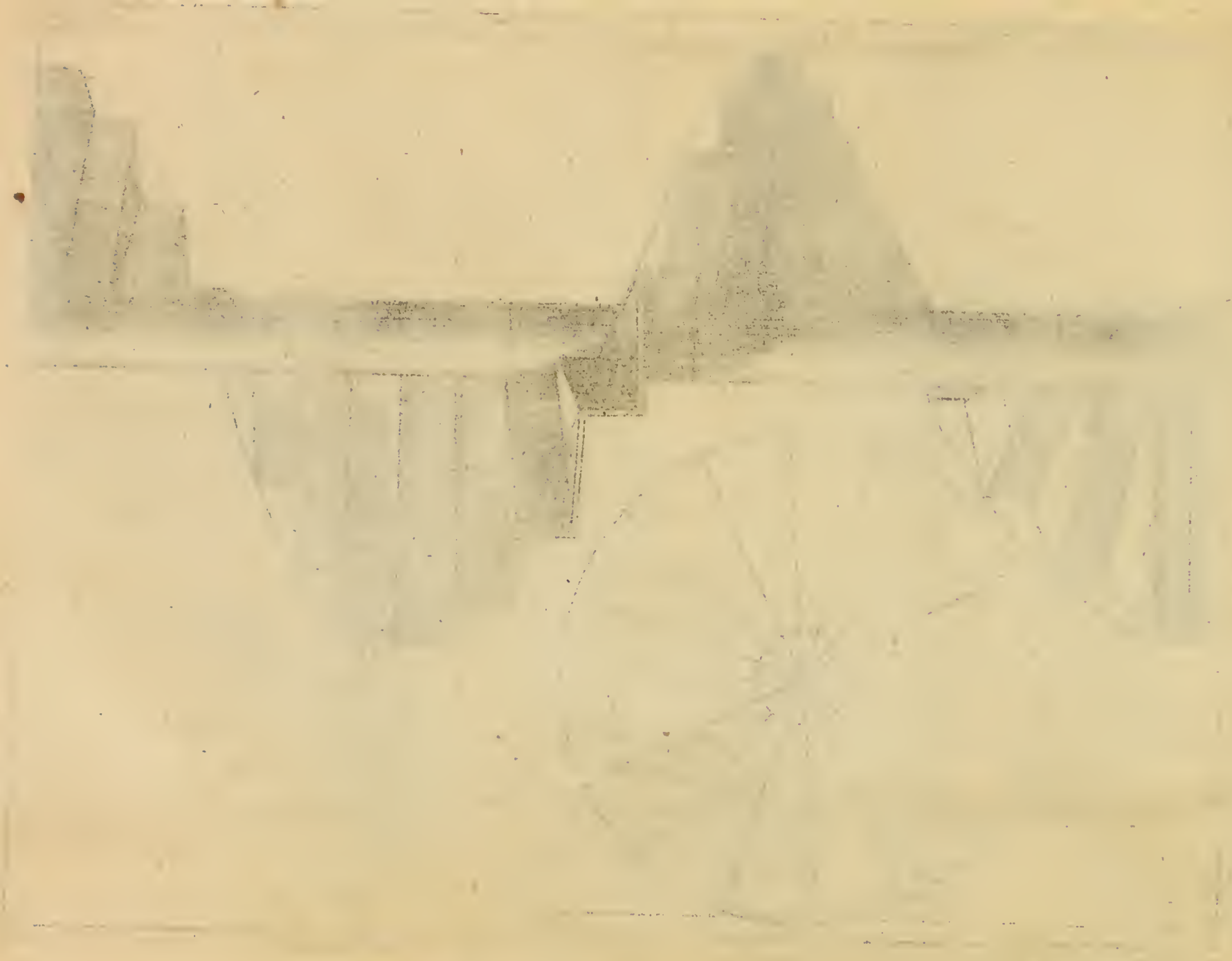

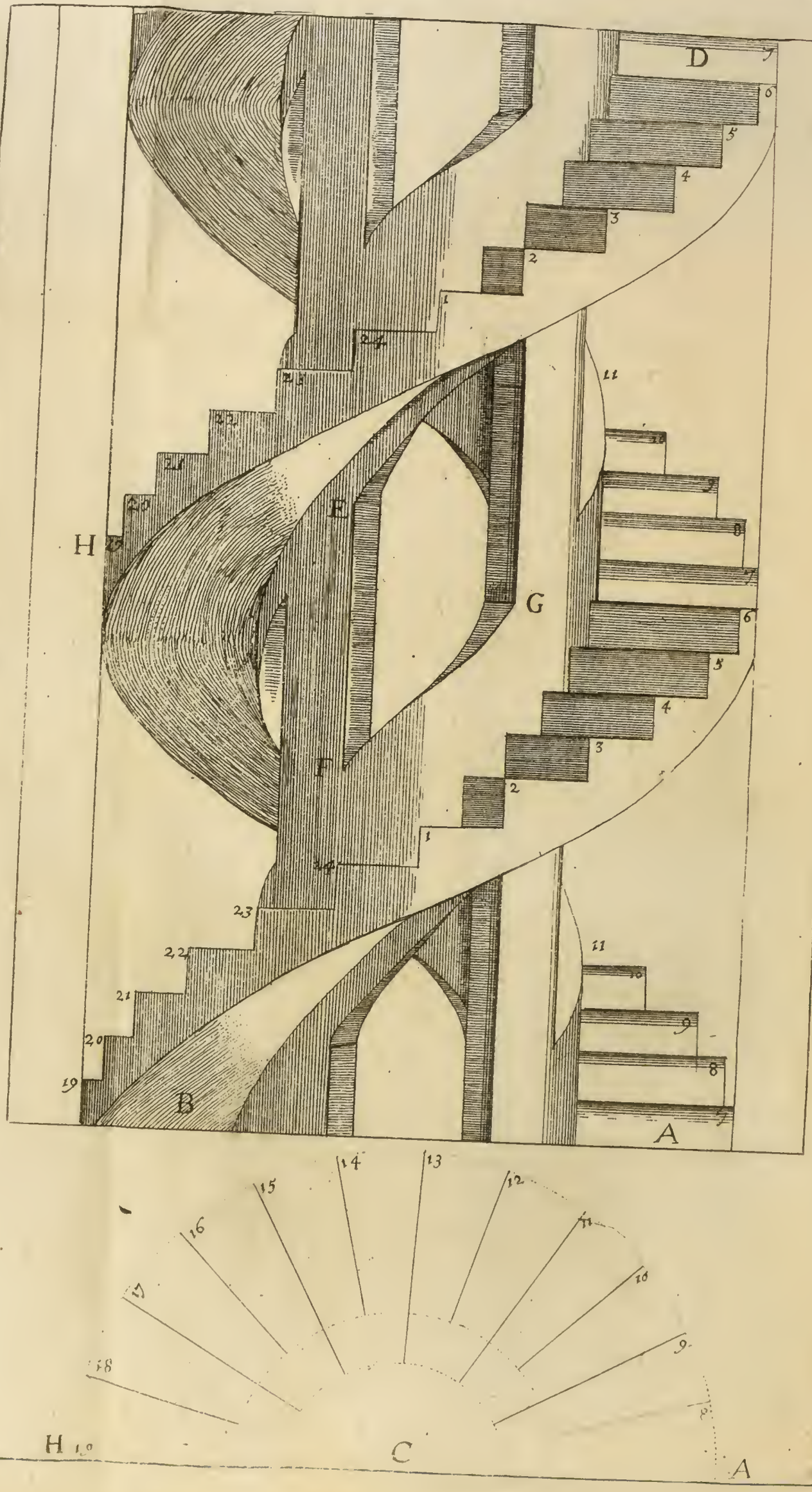
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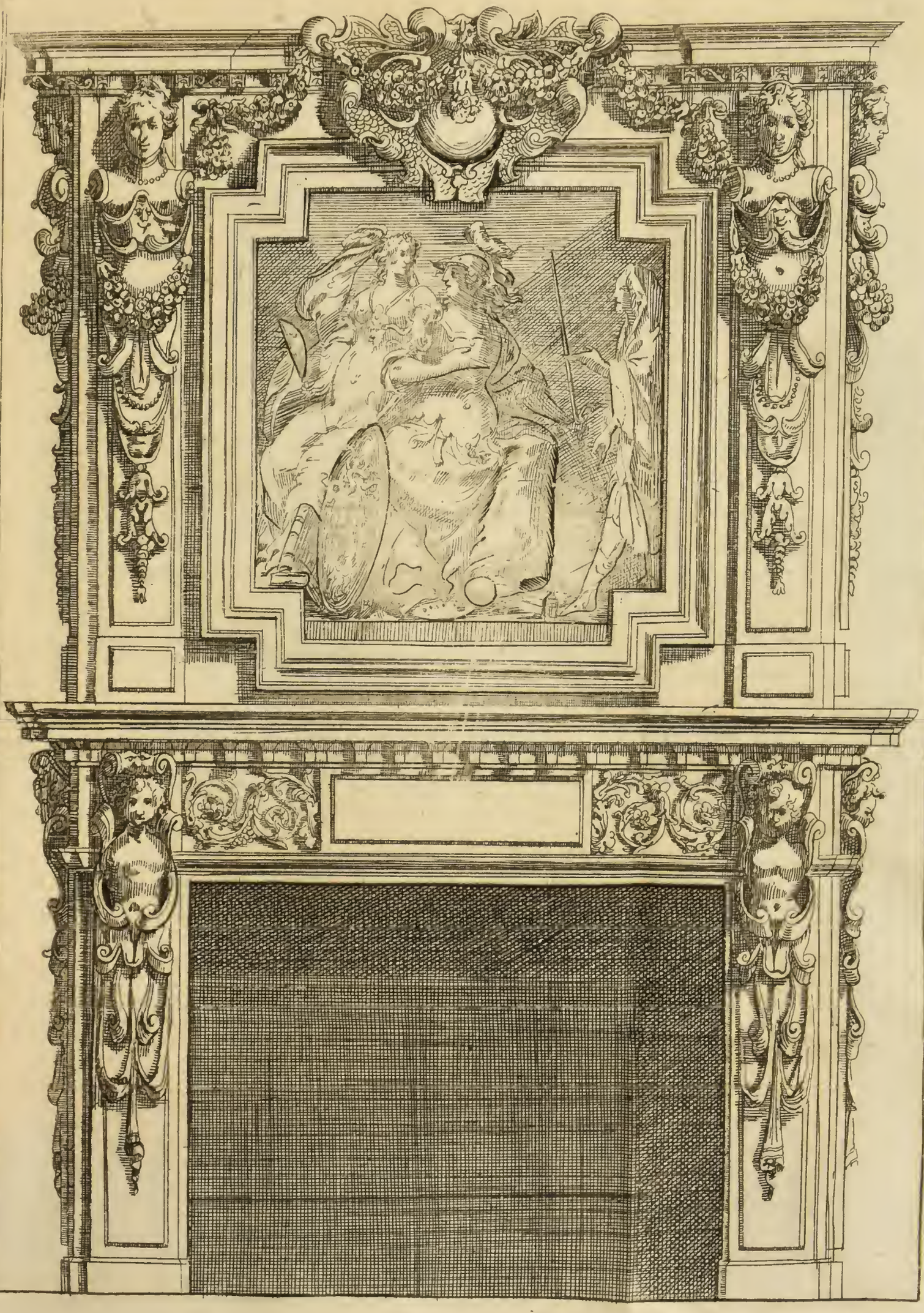
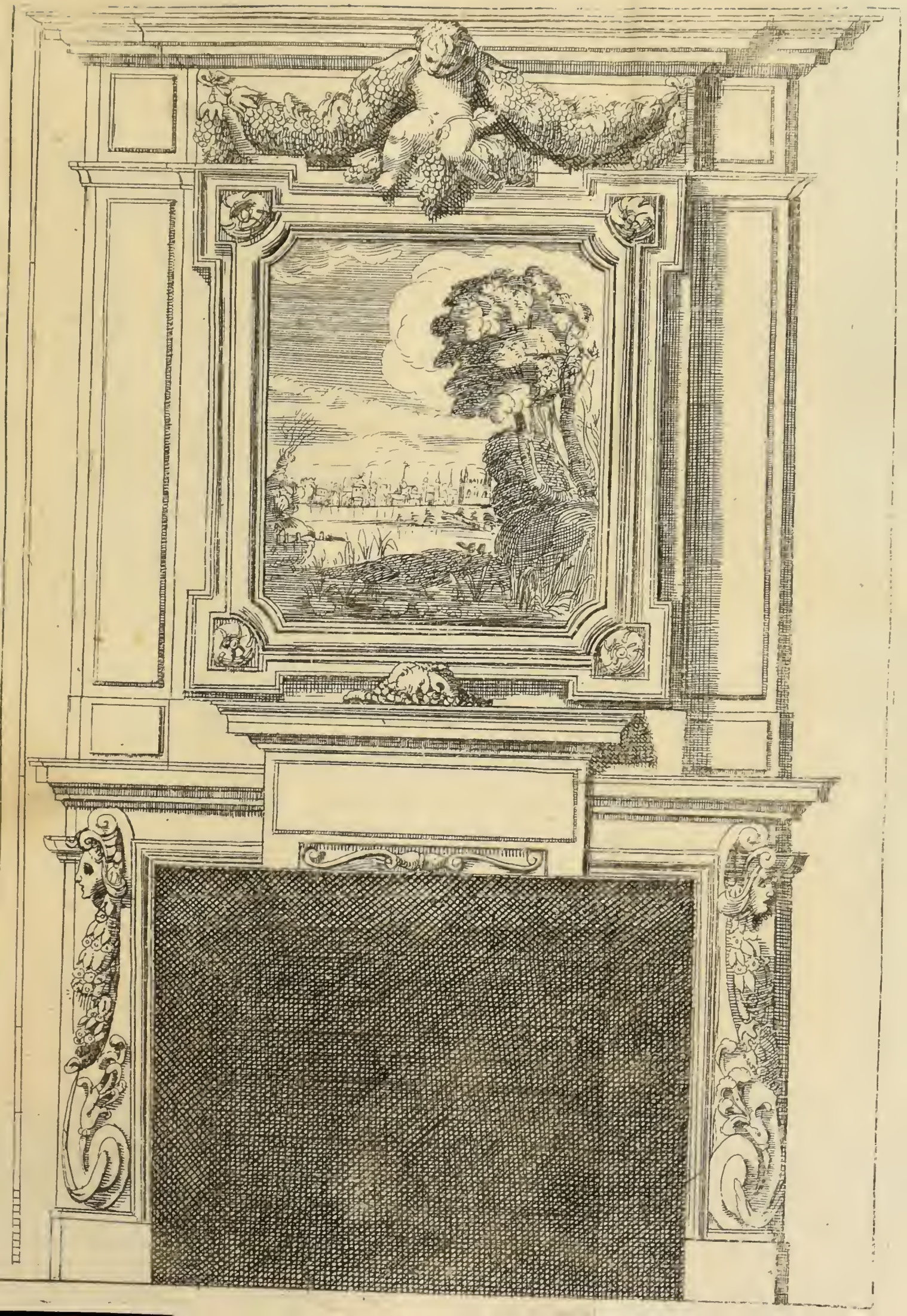
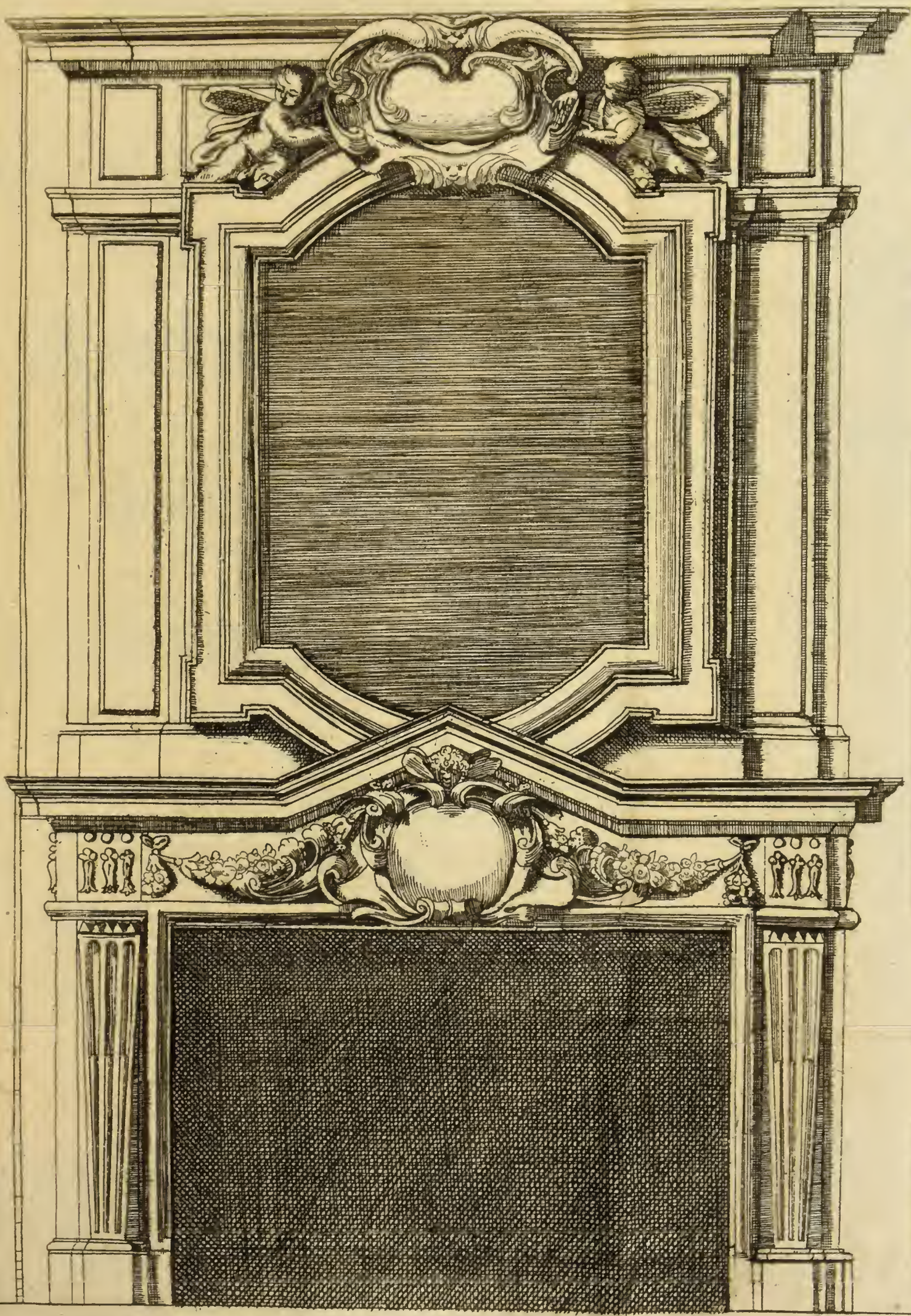






THE DESCRIPTION Of the five Orders of Architecture,

And first

Of the TUSCAN *Order.*

Note, that the Number in the ſeveral Diviſions with the following Explanations, refer to the Figures in the Book as they are marked from 1 *to* 40.

I.

IN the firſt Figure here is ſhown the ſeveral Orders of Columns how they differ from each other, and how high every one muſt be.

The *Tuſcan* muſt be 11 $\frac{1}{4}$ Models high; whereof the Pedeſtal muſt be 1 $\frac{3}{8}$ Model, or 1 Model 52$\frac{1}{2}$ minutes: the Column muſt be 7 $\frac{1}{2}$ Models, the Ornament muſt be 1$\frac{1}{8}$ Model, and ſo the Ornament is one fourth of the height of the Column, and the Pedeſtal alſo is one fourth of the height of the Column.

The *Dorick* muſt be 12 Models 53 ½ minutes high; whereof the Pedeſtal muſt have 2 Models and 16 minutes; the Column muſt be 8½ Models; the Ornament muſt be 2⅛ Models: ſo the Ornament is one fourth of the height of the Column, and the Pedeſtal is 3¾ of the height of the Column.

The *Ionick* muſt be 13 Models high; whereof the Pedeſtal muſt have 2½ Models; the Column muſt have eight Models and three fourths; the Ornament muſt have 1¾ Model: and ſo the Ornament comes to be one fifth part of the height of the Column, and the Pedeſtal 3½ of the height of the Column.

The *Roman* or the *Compoſita* muſt be 14⅞ Models high, or 14 Models 42 minutes; whereof the Pedeſtal muſt be 3 Models; the Column 9¾ Models; and the Ornament muſt have 1 9/20 Model, or 1 Model and 57 minutes: ſo the Ornament comes to he one fifth part of the height of the Column, and the Pedeſtal 3¼ of the height of the Column.

The *Corinthian* muſt be 15⅓ Models high; whereof the Pedeſtal muſt be 3⅓ Models, the Column muſt be 10 Models; the Ornament muſt have 2 Models: and ſo the Ornament comes to be one fifth part of the height of the Column, and the Pedeſtal one third of the height of the Column.

II.

If you would make Galleries without the Pedeſtal, you muſt take the height of 9⅜ Models to make the work the more ſtately; ſo you may make one groſs Baſe under of ½ Model: the breadth muſt be 11⅓ Models; the middle inter-Column muſt be 3 Models; the inter-Column of either ſide muſt be 2⅓ Models. But if you will make them of ſix Columns, they muſt be 18⅓ Models, and of eight Columns, they muſt be 25 Models: the height for the lights of the Gate muſt be 4/7 of the height of the Column, with his Architrave and Frieſe; and comes to 4 Models and 59 minutes; and the breadth is 2/7, the height is 2 models and 29½ minutes: The Ornament muſt be one fourth of the height of the lights, the door is 1¼ Model.

III. The

III.

The *Tuſcan* Arch muſt be 3 Models and 52 minutes wide; the Pilaſters under to the foot of the Column muſt be 34 minutes; the height to the top of the Impoſt is 5 models and 16 minutes; the Impoſt is 27 minutes high, divided into 8 $\frac{1}{4}$; the ſmall Arch or Bow is 26 minutes divided into 8 parts: the Arch muſt make an half Circle, and ſomewhat more than $\frac{1}{8}$ of the Model; and for the projecture of the Impoſt to diminiſh the ſight. Upon the right and left ſide you muſt make Windows; of the middle Gate the Key-piece is 40 minutes high.

IV.

If you will make the *Tuſcan* Gallery with the Pedeſtal, the whole height muſt be 11 $\frac{1}{4}$ Models, and the breadth 13 $\frac{2}{3}$ models of both the outermoſt Columns diſtance, whereof the middle inter-Column muſt be 3 models 40 minutes; the inter-Columns on the right and the left ſide muſt be 3 models: But if you make the Gallery of 6 Columns, they muſt be 21 $\frac{2}{3}$ models; and if they be of eight Columns, they muſt be 29 $\frac{2}{3}$ models: The height for the lights of the Gate muſt be $\frac{4}{7}$ parts of the under-edge of the Pedeſtal, to the upper edge of the Frieſe, and 6 models and 3 $\frac{2}{3}$ minutes; and the breadth is $\frac{2}{7}$ parts, and is 3 Models and 1 $\frac{5}{6}$ minute: the Ornament muſt be one fourth of the height of the lights of the Door, and is 1 model and 31 minutes, whereof the Architrave muſt be 30 $\frac{1}{3}$ minutes; the Frieſe 24 $\frac{1}{4}$ minutes; the Cornice 36 $\frac{1}{2}$ minutes.

V.

The *Tuſcan* Arch is in diſtance from one Pedeſtal to the other 4 models 20 minutes; the Pilaſter on the foot of the Column is 40 minutes; the height from under the Pedeſtal, to the upper edg of the Impoſt, is 6 models, 12 ½ minutes; the height of the Impoſt is 41 ⅚ minutes; the Arch or Bow is 29 minutes; the Key-piece in the Arch is 50 minutes high; the Arch is higher ½ a Circle and 10 minutes for the projecture of the Impoſt: there the Arch beings, divided into 5 parts, 4 of the ſame are for the lights of the Door of the principal Gate, and is 5 models and 5 minutes; the breadth of the lights is 2 models 32 ½ minutes; the Ornament is 1 model 16 ½ minutes high, whereof the Architrave muh have 25 ½ minutes; the Frieſe 20 $\frac{5}{12}$ minutes; the Cornice 30 $\frac{7}{12}$ minutes: or divide the Ornament 1 model 16 minutes in fifteen parts, and give five to the Architrave, four the Frieſe, ſix the Cornice.

VI.

The ſixth ſhews the particular members of the *Tuſcan* Column: On the right ſide have we the Pedeſtal and the Baſe: the Pedeſtal is ¼ of the height of the Column, and comes to 1 ⅞ model, which muſt be divided into 5 parts; whereof give the under-*Cimacium* and the Plinth 1 ⅓ of the *Troco*, make 2 ⅔ the upper *Cimacium* 1 part, the upper *Cimacium* is 22 ½ minutes: divided into 5 $\frac{7}{24}$ parts, the Baſe is ½ a model, and is to be divided into 5 parts. Under the body of the Column is one ſmall liſt of ½ part, making 3 minutes: of the left ſide is the Ornament and the Capital; the Capital is ½ model high, and is to be divided in 10 parts; the like part hath alſo the Aſtragal; the Ornament is ¼ off; the Column high take 1 ⅞ model: this divided in 17 ½ parts, whereof give the Architrave 5. prrts, the Frieſe 6 ⅓ parts; the Corniſh 6 parts; the Architrave 5 parts, is 32 ½ minutes, divided in 8 ⅞ parts; the Frieſe is 41 minutes, with his uppermoſt liſt, which is placed right over the middle of the Column, ſo high as the Frieſe is, and the breadth 30 minutes: after this breadth the Frieſe jets out 7 ½ minutes. Here is alſo after the Frieſe the Liſt of 2 ½ minutes; the Ornament

ment is 39 minutes high, divided in 4 $\frac{7}{8}$ parts, ſo you may this Column, and all its members, with the Impoſt; and alſo all the other four Columns muſt be divided after the ſame manner with minutes; whereof the Column muſt be divided into ſixty minutes, and made after this manner: The Scale is made in the firſt Figure, and the Rule wherewith you divide your parts ſhall be ſet P, and for minutes an M. it may be eaſily underſtood.

VII.

Here followeth the great and ſmall Impoſt with his Arch and Ornament of the Principal Gates; upon the right ſide is the Impoſt and Arch; the Impoſt and Arch of the ſmall Arch ſtands beneath, marked with the Letter K; the Impoſt is 27 minutes high, divided in 8 $\frac{1}{4}$ parts; the like part hath Aſtragal of the Impoſt: the ſmall Arch or Bow is 26 minutes, divided in 8 $\frac{7}{8}$ parts; the height of the great Impoſt is 41 $\frac{5}{6}$ minutes divided in 6 parts; the great Arch or Bow is 29 minutes high, divided in 8 $\frac{7}{8}$ parts. Of the left ſide is the Ornament of the principal Gate, and is 1 model 16 $\frac{1}{2}$ minutes high, whereof cometh 25 $\frac{1}{2}$ minutes: the Architrave divided into 8 $\frac{1}{3}$ parts; the Frieſe is 20 $\frac{5}{12}$ minutes high; the Corniſh is 30 $\frac{7}{12}$ minutes high, divided in 4 $\frac{7}{12}$ parts.

VIII.

Of the DORICK *Order.*

IF you will make the *DORICK* Gallery without the Pedeſtal, then muſt you divide the whole height into 10 models 37 $\frac{1}{2}$ minutes; and to make the Work appear the ſtatelier, you may make one groſs Baſe under of half a model high, and of 4 Columns breadth muſt be 9 models 45 minutes; whereof the middle inter-Column muſt be 2 $\frac{3}{4}$ models; the inter-Columns of either ſide muſt be 1 $\frac{1}{2}$ model; of 4 Columns breadth in the Frieſe muſt be 8 Triglyphs, and 7 Metops: but you will make them of 6 Columns, you muſt divide the breadth into 14 $\frac{3}{4}$ models; and there muſt be in

the

the Frieſe of the 6 Columns 12 Triglyphs and 11 Metops: Alſo if you will make the Gallery of eight Columns, then muſt the breadth be 19 ¾ models; the height of the lights of the door is ⅘ of the height of the column with his Architrave and Frieſe, and comes to 5 ⅓ models and the breadth of the light of the door muſt be 2 models 40 minutes: the Ornament muſt be ¼ of the height of the lights of the door; and is 1 model 20 minutes divided in 15 parts; give 5 to the Architrave, 4 the Frieſe, 6 the corniſh; and ſo the Architrave is 26 ⅔ minutes, the Frieſe 21 ⅓ minutes, the Corniſh 32 minutes.

IX.

The *Dorick* Arch muſt be 6 models 15 minutes wide from the middle of one Column, to the middle of the other; and muſt ſtand a little more than half out of the Pilaſter: the Pilaſter is 32 minutes broad under on the Foot of the Column; the Impoſt is 27 ½ minutes high, divided in 8 ⅛ parts: the like part alſo hath the Aſtragal: underneath the height of the Arch or Bow is 27 ¼ minutes divided into 6 ⅓ parts; the Key-piece in the Arch is high 40 minutes; the Arch is higher than half a Circle 10 minutes for the Projecture of the Impoſt; the height to the top of the Impoſt from the Baſe is 6 models 4 ½ minutes.

X.

The *Dorick* Gallery with the Pedeſtal, the whole height of the Column muſt be 12 models and 53 ½ minutes; and four Columns muſt be 13 ½ models broad, whereof the middle inter-Column muſt be 4 models; the inter-Column of the ſide 2 ¾ models: Upon the four Columns muſt be 11 Triglyphs and 10 Metops; but 6 Columns muſt be 21 models broad, and 17 Triglyphs, and 16 Metops; but 8 Columns muſt be the breadth of 28 ½ models, 23 Triglyphs and 22 Metops: the light of the door is ⅘ of the under edge of the pedeſtal, to the uppermoſt edge of the Frieſe, and is 6 models 57 ¾ minutes; the breadth is 3 models 24 ¼ minutes; the Ornament is high one fourth of the height of the

the lights, and $\frac{1}{4}$ which is 1 model $38\frac{1}{6}$ minutes, whereof the Architrave muſt have $32\frac{3}{4}$ minutes, the Frieſe $26\frac{1}{6}$ minutes, the Corniſh $39\frac{1}{4}$ minutes.

XI.

If you would make the *Dorick* Gallery with the Pedeſtal, then muſt the diſtance from one Pilaſter to the other be $5\frac{1}{4}$ models; the height from the under-edge of the Pedeſtal to the upper-edge of the Impoſt, is 7 models 6 minutes; the Impoſt is 50 minutes high; the Arch or Bow 34 minutes; the Corner-piece is 50 minutes; the Arch is higher than a half-Circle $12\frac{1}{2}$ minutes for the projecture of the Impoſt; the height of the lights for the Doors is 5 models and 52 minutes: the breadth of the Lights is two models and 52 minutes: the Ornament is 1 model $23\frac{1}{2}$ minutes high, of which the Architrave hath $27\frac{5}{6}$ minutes; the Frieſe is $22\frac{1}{4}$ minutes; the Corniſh is $33\frac{5}{12}$ minutes: or divide the Ornament in 15 parts, 5 the Architrave, 4 the Frieſe, 6 the Liſt.

XII.

Here is ſhown the particular members of the *Dorick* Column: On the right ſide we have the Pedeſtal and the Baſe; the Pedeſtal is $3\frac{1}{4}$ of the height of the Column, and comes to 2 models and 16 minutes, divided into 6 parts; whereof give the under-*Cimacium* 2 parts, the body of the Column makes 3 parts; the upper *Cimacium* 1 part, the under-*Cimacium* is 45 minutes: There hath the Plinth 30 minutes; the other members in 15 minutes, divided into $3\frac{3}{4}$ parts; the upper *Cimacium* is $22\frac{1}{2}$ minutes divided in $5\frac{3}{24}$ parts; the Baſe is one half model, divided in $5\frac{2}{3}$ parts; the Liſt upon the Baſe is $\frac{1}{3}$, or 2 minutes, and ſtands off from the Column: on the left ſide is the Ornament and Capital; the Capital is one half model high, divided in $11\frac{1}{2}$ parts; and the like part hath the Aſtragal: the Ornament is $\frac{1}{4}$ of the height of the Column, and is 2 models $7\frac{1}{2}$ minutes divided in $18\frac{1}{6}$; thereof give the Architrave 5 parts, is 35 minutes divided in $7\frac{1}{3}$ parts; the Frieſe $6\frac{1}{3}$ parts, is 45 minutes; the Liſt above the Frieſe $\frac{2}{3}$ is 5 minutes; the Corniſh 6 parts 42 minutes, divided in $6\frac{7}{24}$ parts.

parts (the Author gives 6 ¼ parts) that it may come forth more: in the Corniſh muſt come in 10 Dentils, beſides the Grape that hangeth on each ſide.

XIII.

Here is ſhewn the great and ſmall Impoſt with his Arch and Ornament of the Principal Gate of the *Dorick* Order: On the right ſide is the Impoſt and Arch, the Impoſt and the Arch of the ſmaller Bow, ſtanding below, marked with the Letter K: the Impoſt is 27 ½ minutes high, divided in 8 ⅚; a like part hath alſo the Aſtragal of the Impoſt; the ſmall Arch or Bow is 27 ¼ minutes, divided in 6 ⅓ parts; the height of the Impoſt Major or greater Impoſt, is 50 minutes, divided into 9 ⅜ parts; the great Arch or Bow is 34 minutes high, divided in 6 ⅓ parts: On the left ſide is the Ornament of the principal Gate; and is high 1 model 23 ½ minutes, whereof the Architrave hath 27 ⅚ minutes, divided in ſix ⅔ parts; the Frieſe is 22 ¼ minutes; the Corniſh is 33 1 ½ minutes, divided in 4 ¾ parts.

XIV. *Of*

XIV.

Of the IONICK *Order.*

IF you would make the *IONICK* Gallery without the Pedeſtal, then muſt you divide the whole height in 10 ½ models, to make the Work ſhew the more ſtately; and under it make one groſs Baſe of half a model high, and of four Columns breadth muſt be 10 models and 21 minutes; whereof the middle inter-Column muſt have 2 ½ models: the inter-Columns that ſtand on the right and left ſide muſt be 1 model 55 ½ minutes; on the middle of each Column and the Pilaſter muſt be one modilion; in the outermoſt inter-Columns ſhall be 5 ſpaces, in the middlemoſt 6 ſpaces; the four Columns have from the middle of the firſt to the middle of the laſt Column 16 ſpaces and modillions: but if men will make them of 6 Columns, then muſt they divide the breadth in 16 ⅙ models, and there comes on the 6 Columns between the modillions 26 ſpaces; and of eight Columns muſt the breadth be 22 models, and there comes on the 8 Columns 36 ſpaces between the modillions: the height of the lights of the Doors is ⅘ of the height of the Column, with his Architrave and Frieſe above the modillions, and the light comes to 5 models and ⅚; the breadth of the lights of the doors comes to 2 models 48 ½ minutes; the Ornament muſt be ¼ and ½ of the height of the lights of the doors, and is 1 model and 18 minutes, divided in 15 parts; give 5 to the Architrave, 4 the Frieſe, 6 the Corniſh; and the Architrave is 26 ¾ minutes, the Frieſe 20 minutes, the Corniſh 31 ¼ minutes.

XV.

The minor or ſmaller *Ionick* Arch muſt be wide from one Pilaſter to the other 3 models 50 minutes, aud muſt ſtand more than one half out of the Pilaſter; the Pilaſter is 30 minutes under on the breadth of the Column; the Impoſt is high 28 $\frac{1}{2}$ minutes, divided in 9 $\frac{1}{2}$ parts; ſuch like parts hath alſo the Aſtragal there under the height of the Arch or Bow 24 $\frac{1}{4}$ minutes, divided in 7 $\frac{1}{2\frac{1}{4}}$ parts; the Key-piece in the Arch is 50 minutes high; the Arch is higher than one half Circle 12 minutes; the height from above the Impoſt to the under-edge of the Baſe, is 6 models and 18 minutes.

XVI.

The *Ionick* Gallery with the Pedeſtal, the whole height of the Column muſt be 13 models, and the 4 Columns breadth muſt be 12 $\frac{2}{3}$ models, whereof the middle inter-Column muſt be 3 $\frac{1}{3}$ models; the inter-Column on the ſide muſt be 2 $\frac{1}{2}$ models; on the four Columns, from the middle of the firſt, to the middle of the laſt Column, cometh 20 ſpaces and modillions, of 6 Columns breadth is 19 $\frac{2}{3}$ models, and hath 32 ſpaces between the modillions; and of 8 Columns breadth is 26 $\frac{2}{3}$ models, and hath 44 ſpaces between the modillions: the light of the door is $\frac{4}{7}$ from the under-edge of the Pedeſtal of the Column, Architrave and Frieſe, to the upper-edge of the modillions, and is 7 models 17 minutes; the breadth of the door of the lights is 3 models 30 $\frac{3}{8}$ minutes; the Ornament muſt be $\frac{1}{4}$ and $\frac{1}{2}$ of the height of the lights of the doors, and is 1 $\frac{1}{8}$ model divided in 15 parts; give 5 to the Architrave, 4 the Frieſe, 6 the Corniſh; the Architrave is 32 $\frac{1}{2}$ minutes, the Frieſe 26 minutes, the Corniſh 39 minutes.

XVII.

If you would make the *Ionick* Arch with the Pedeſtal, then muſt the diſtance from one Pilaſter to the other be 4 models and 50 minutes; the height from the under-edge of the Pedeſtal, to the upper-edge of the Impoſt, is 7 models and 35 minutes the Impoſt is 50 $\frac{1}{4}$ minutes high; the Arch or Bow 30 $\frac{1}{2}$ minutes; the corner-piece 1 model; the Arch is higher than one half Circle 15 minutes; the height of the lights of the door is 6 models 16 $\frac{1}{2}$ minutes; the breadth of the lights is 3 models and 2 minutes; the Ornament is high 1 model 25 $\frac{1}{2}$ minutes; the Architrave hath 28 $\frac{1}{2}$ minutes; the Frieſe hath 22 $\frac{4}{5}$ minutes; the Corniſh 34 $\frac{1}{5}$ minutes; the Pilaſter is 35 minutes broad under on the Column.

XVIII.

Here is ſhown the particular members of the *Ionick* Column: On the right ſide you have the Pedeſtal and Baſe; the Pedeſtal is 3 $\frac{1}{2}$ of the height of the Column, and comes to 2 $\frac{1}{2}$ models, which divided into 6 $\frac{2}{3}$, thereof give the under-*Cimacium* 2 parts, the Trunk or the Neck 3 $\frac{2}{3}$; the upper-*Cimacium* is 1 part, the under-*Cimacium* 45 minutes; thereof give the Plinth 30 minutes, the other 15 minutes, divided in 4 $\frac{1}{4}$ parts; the upper-*Cimacium* is 22 $\frac{1}{2}$ minutes divided in 6 $\frac{5}{8}$ parts; the Baſe is half a model, divided in 5 $\frac{7}{12}$ parts; on the Column be two members, divided out with the aforeſaid parts, is 3 $\frac{3}{4}$ minutes: On the left ſide is the Capital and Ornament; the Capital is 31 $\frac{1}{2}$ minutes high of the under-edge of the Scroll, or more; the Aſtragal on the upper-edge of the *Abaeus* is 18 $\frac{1}{6}$ minutes, divided in 7 $\frac{1}{40}$ parts: The Ornament is 1 $\frac{3}{4}$ model high, and is $\frac{1}{5}$ of the height of the Column, divided in 15 parts, give the Architrave 5, the Frieſe 4, the Corniſh 6, the Architrave 5 parts and 35 minutes, divided in 8 $\frac{1}{4}$ parts; the Frieſe is 28 minutes, and muſt have one Liſt on of $\frac{1}{4}$ part, ſuch like part as the Corniſh hath of 1 $\frac{1}{2}$ minute; the Corniſh is 42 minutes, divided in 7 $\frac{1}{12}$ parts, and $\frac{1}{2}$ twelfth part, or in 7 $\frac{1}{24}$ parts; but if you are to make great or Royal Work, then commonly is the Frieſe carved: So muſt

the Ornament be between $\frac{1}{4}$ and $\frac{1}{5}$ part of the height of the Column, and divided in 16 $\frac{2}{3}$ parts; give the Architrave 5 parts, the Frieſe 5 $\frac{2}{3}$ the Corniſh 6 parts.

XIX.

Here is ſhewn the great and ſmall Impoſt with his Arch and Ornament of the principal Gate of the *Ionick* Order: On the right ſide is the Impoſt and Arch, the Impoſt and the Arch of the ſmall Bow, ſtanding beneath the Impoſt, is 28 $\frac{1}{2}$ minutes high, divided in 9 $\frac{1}{2}$ parts; ſuch like parts hath alſo the Aſtragal: The Arch or Bow is 24 $\frac{1}{4}$ minutes, divided in 7 $\frac{1}{2}\frac{1}{4}$ parts; the great Impoſt, is high 50 $\frac{1}{4}$ minutes, divided in 8 $\frac{1}{2}\frac{1}{4}$ parts; the great Arch or Bow is high 30 $\frac{1}{2}$ minutes, divided in 7 $\frac{1}{2}$ parts: On the left ſide is the Ornament of the Principal Gate, and is high 1 model 25 $\frac{1}{2}$ minutes; the Architrave is high 28 $\frac{1}{2}$ minutes, divided in 7 parts; the Frieſe is high 22 $\frac{4}{5}$ minutes; the Corniſh is high 34 minutes, divided in 5 $\frac{1}{2}\frac{7}{4}$ parts; under and above the Frieſe is one fillet of $\frac{1}{4}$ part of the aforeſaid parts.

XX.

Of the ROMAN *Order.*

IF you would make the *ROMAN* Gallery without the Pedeſtal, then muſt you take the height of 11 $\frac{7}{10}$ models, and make one groſs Baſe under of $\frac{1}{2}$ model high; and of 4 Columns breadth muſt be 9 models 40 minutes, whereof the middle inter-Column muſt have 2 $\frac{1}{4}$ models; the inter-Column ſtanding on the right and left ſide, muſt be 1 model 42 $\frac{1}{2}$ minutes: On the middle of each Column muſt come one Modillion; and in the outer inter-Column muſt come 5 ſpaces; in the middle inter-Column 6 ſpaces: the 4 Columns have from the middle of the firſt to the middle of the laſt Column 16 ſpaces and Modillions; but if you make them 6 Columns, then muſt the breadth be 15 $\frac{1}{12}$ models, and there comes on the 6 Columns between the Modillions 26 ſpaces; and of 8 Columns the breadth muſt be 20 $\frac{1}{2}$ models, and there comes on the 8 Columns 36 ſpaces between the Modillions: the height of the lights of the doors is $\frac{4}{7}$ of the height of the Column with his Architrave and Frieſe: from the upper edge of the Modillions, and the lights, is of 6 models 30 minutes; and the breadth of the lights of the doors, of 3 models 25 minutes: The Ornament muſt be 3 $\frac{1}{4}$ parts of 15 parts of the height of the lights, and is 1 model 24 $\frac{1}{2}$ minutes divided in 15 parts; 5 for the Architrave, 4 the Frieſe, 6 the Corniſh; and the Architrave is 27 $\frac{1}{2}$, the Frieſe 22, the Corniſh 33, without the *Gola* and *Orle*, the which next belongs to the Corniſh of the Frontiſpiece.

XXI.

The ſmall *Roman* Arch muſt be from one Pilaſter to the other 4 models and 34 minutes, and muſt ſtand ſomewhat more than half out of the Pilaſter: the Pilaſter is 28 minutes; under on the breadth of the Column, the Impoſt is high 31 $\frac{1}{9}$ minutes, divided in 11 $\frac{1}{12}$ parts: ſuch like parts hath alſo the Aſtragal: there under the height of the Arch or Bow is 28 minutes, divided in 7 $\frac{2}{3}$ parts; the Key-piece in the Arch is high 50 minutes; the Arch is higher than one half-Circle 14 minutes; the height from above the Impoſt, from the under-edge off from the Baſe, is 6 models 54 minutes.

XXII.

The *Roman* Gallery with the Pedeſtal, the Column muſt be 14 models 42 minutes high; and the breadth of 4 Columns muſt be 11 models and 50 minutes; whereof the middle inter-Column muſt be 3 $\frac{1}{3}$ models: the inter-Column on the ſide 2 models 15 minutes: On the 4 Column from the middle of the firſt, to the middle of the laſt Column cometh 20 ſpaces and Modillions; of 6 Columns breadth is 18 models and 20 minutes, and hath 32 ſpaces between the Modillions; and of 8 Columns breadth is 24 models and 50 minutes, and hath 44 ſpaces between the Modillions: the lights of the doors is high $\frac{4}{7}$ from the under edge of the Pedeſtal with his Column; the Architrave and Frieſe to the upper edge of the Modillions, comes to 8 models 12 $\frac{4}{5}$ minutes; the breadth of the lights of the doors is 3 models 53 $\frac{1}{2}$ minutes; the Ornament muſt be $\frac{3}{14}$ and $\frac{1}{4}$; for the Architrave, Frieſe, and Corniſh of the height of the lights of the doors, and comes to 1 model and 53 minutes, divided in 15 parts; give 5 to the Architrave, 4 the Frieſe, 6 the Corniſh; and the Architrave is 37 $\frac{2}{3}$ minutes, the Frieſe 30 $\frac{1}{6}$ minutes, the Corniſh is 45 $\frac{1}{6}$ minutes.

XXIII.

If you make the *Roman* Arch with the Pedeſtal, then muſt the diſtance from one Pilaſter to the other be 5 ½ models; the height from the under-edge of the Pedeſtal to the upper-edge of the Impoſt, is 8 models 42 ½ minutes; the Impoſt is high 55 ½ minutes; the Arch or Bow is 33 minutes; the Corner-piece is 1 model high; the Arch is higher than a half-Circle 17 ½ minutes; the lights of the Doors is 7 models 18 minutes high: the breadth of the Lights is 3 models 26 ½ minutes: the Ornament is high 1 model 24 minutes; thereof the Architrave hath 31 ⅓ minutes; the Frieſe is 25 1/12 minutes; the Corniſh is 37 7/12 minutes: the Pilaſter under on the Column is 32 ½ minutes broad; the Architrave 31 ⅓ minutes, divided in 7 ⅔ parts; the Corniſh is 37 7/12 minutes, divided in 5 ⅔¾ parts; about the Frieſe is one Liſt of ¼ part that goes off from the Frieſe.

XXIV.

Here is ſhewn the particular members of the *Roman* Column: On the right ſide you have the Pedeſtal and Baſe: the Pedeſtal is 3 ¼ of the Column's height, and comes to 3 model, which divided in 8 parts, give thereof the under-*Cimacium* 2 parts, the neck 5 parts, the upper *Cimacium* 1 part, the under *Cimacium* 45 minutes: thereof give the Plinth 30 minutes, the other 15 minutes, divided in 4 ⅙ parts; the neck of the Pedeſtal is high 1 ⅞ model, and the breadth is 1 model 24 minutes; the upper *Cimacium* is 22 ½ minutes, divided in 6 ⅘ parts; the Baſe is ½ model, divided in 6 parts: On the Column be two members, and are to be divided out with the aforeſaid parts 3 ¾ minutes. On the left ſide is the Capital and Ornament; the Capital is high 1 model and ⅙, or 70 minutes, which divided in 23 ⅓ parts, to make the ground of the Capital, take 1 Square of 1 ½ model, each ſide of the Square draw one round Circle of 4/7 of a model, or 51 minutes, or ſo thick as the Column is above, and all the other jettings over the like, as be made in *Corinthi*; but the Scrolls are made after the *Ionick* manner: The Ornament is 1 model 57 minutes,

nutes and is $\frac{1}{5}$ of the height of the Column, divided in 15 parts; thereof give the Architrave 5 parts, the Frieſe 4 parts; the Corniſh 6 parts; the Architrave 5 parts is 39 minutes, divided into 9 parts; the Frieſe 31 $\frac{1}{4}$ minutes; the Corniſh 46 $\frac{3}{4}$ minutes, divided in 7 $\frac{1}{1\,2}$ and a half part, or in 7 $\frac{2}{2}\frac{3}{4}$.

XXV.

Here follows the great and ſmall Impoſt with his Arch and Ornament of the principal Gate of the *Roman* Order: On the right ſide is the Impoſt and Arch; the Impoſt and Arch of the ſmall Bow ſtanding beneath, the Impoſt is high 31 $\frac{1}{3}$ minutes, divided in 11 $\frac{1}{1\,2}$ parts; ſuch like part hath alſo the Aſtragal; the Arch or Bow is high 28 minutes, divided in 7 $\frac{2}{3}$ parts; the great Impoſt is high 55 $\frac{1}{2}$ minutes, divided in 8 $\frac{1}{1\,5}$ parts; the great Arch or Bow is high 33 $\frac{7}{8}$ minutes, divided in 7 $\frac{2}{3}$ parts. On the left ſide is the Ornament of the principal Gate, and is high 1 model 24 minutes; the Architrave is high 31 $\frac{1}{3}$ minutes, divided in 7 $\frac{2}{3}$ parts; the Frieſe is high 25 $\frac{1}{1\,2}$ minutes; the Corniſh is high 37 minutes and $\frac{7}{1\,2}$, divided in 5 $\frac{2}{2}\frac{3}{4}$ parts; under on the Frieſe is one liſt of $\frac{1}{4}$ part and $\frac{1}{2}$ minute.

XXVI.

Of the CORINTHIAN *Order.*

IF you will make the *CORINTHIAN* Gallery without a Pedeſtal, then muſt you divide the whole height in 12 models, and you ſhall place under it one groſs Baſe of one half model high, and of the 4 Columns breadth muſt be 9 models; whereof the middle inter-Column muſt have 2 models: they that ſtand on the right and left ſide muſt have the inter-Column of 1 $\frac{1}{2}$ model; on the middle of each Column and Pilaſter muſt be one modillion; in the outermoſt inter-Column ſhall be 5 ſpaces, and in the middle 6; the 4 Columns have from the middle of the firſt to the middle of the laſt Column 16 ſpaces and modillions: but if you make them of the breadth of 6 Columns, then muſt you divide the breadth into 14 models; and there comes on the 6 Columns between the modillions 26 ſpaces; and of the 8 Columns the breadth muſt be 19 models, and there comes on the 8 Columns 36 ſpaces between the modillions: the height of the Lights of the Doors is $\frac{4}{7}$ of the flat of the Column that come under the ſpaces of the modillions, or in 6 parts under to the Architrave; and the Light is of 6 $\frac{2}{3}$ models; the breadth of the Lights is 3 models and 5 minutes; the Ornament muſt be $\frac{1}{5}$ of the height of the Light, and divided likewiſe in 15 of the like parts; give 5 to the Architrave, 4 the Frieſe, and 6 the Corniſh; and the Architrave is 26 $\frac{2}{3}$ minutes, the Frieſe 21 $\frac{1}{3}$ minutes, the Corniſh 32 minutes: So the whole Ornament is 1 model 20 minutes.

XXVII.

The ſmall *Corinthian* Arch muſt be 4 models 8 minutes wide from one Pilaſter to the other, the Pilaſter is 26 minutes broad under on the Column, the Impoſt is 33 $\frac{1}{3}$ minutes high, divided in 7 $\frac{2}{4}$ parts: the height of the Arch or Bow is 25 minutes, divided in 9 $\frac{1}{12}$ parts; the Key-piece in the Arch is 50 minutes high; the Arch is higher than one half-Circle 16 minutes; the height from above the Impoſt to the under-edge off of the Baſe, 7 models and 20 minutes.

XXVIII.

The *Corinthian* Gallery with the Pedeſtal, the Column muſt be 15 $\frac{1}{3}$ models high; and the breadth of 4 Columns 11 models; whereof the middle inter-Column muſt be 3 models; the inter-Column on the ſide muſt be 2 models: On the 4 Columns from the middle of the firſt, to the middle of the laſt cometh 20 ſpaces and Modillions, of 6 Columns breadth is 17 models, and hath 32 ſpaces between the Modillions; and of the breadth of 8 Columns is 23 models, and hath 44 ſpaces between the Modillions: the Light of the door is $\frac{4}{7}$ of the under-edge of the Pedeſtal with his Column to the upper-edge of the Modillion, and is 8 models 32 $\frac{1}{2}$ minutes high; the breadth of the Lights of the door is 3 models 59 $\frac{1}{6}$ minutes; the Ornament muſt be $\frac{1}{5}$ of the height of the Lights of the doors, and is 1 model 42 $\frac{3}{5}$ minutes, divided into 15 parts; thereof the Architrave hath 5 parts, and the Frieſe 4, and the Corniſh 6; and the Architrave is 34 minutes, the Frieſe 27 minutes, the Corniſh is 41 minutes.

XXIX. If

XXIX.

If you will make the *Corinthian* Arch with the Pedeſtal, then muſt the diſtance from one Pilaſter to the other be 5 models; the height from the under-edge of the Pedeſtal, to the upper-edge of the Impoſt, is 9 ½ models; the Impoſt is high 55 1/12 minutes; the bigneſs of the Arch muſt be 1/10 of the breadth, like the foregoing Arch, and is 30 minutes; the Corner-piece 1 model; the Arch is higher than one half Circle 20 minutes; the height of the Lights of the door is 8 models, and the breadth of the Lights of the door is 3 models 45 minutes, the Ornament is high 1 model 36 minutes; the Architrave hath 32 minutes, divided in 9 ⅙ parts; the Frieſe is 25 ½ minutes, and hath one liſt of ⅕ part under the Corniſh; the Corniſh is 38 ½ minutes, divided in 5 ⅗ parts; the Pilaſter under on the Column is 30 minutes broad.

XXX.

Here followeth the particular members of the *Corinthian* Column: On the right ſide you have the Pedeſtal and Baſe; the Pedeſtal is ⅓ of the heighth of the Column, and is 3 ⅓ models, which divided in ⅜ 8 parts, thereof give the under-*Cimacium* 2 parts, the Neck of the Pedeſtal 5 ⅞ parts; the upper-*Cimacium* 1 part, the under-*Cimacium* is 45 minutes; thereof give the Plinth 30 minutes, the other member is 15 minutes, divided in 4 ⅛ parts; on the *Cimacium* is alſo two members, one *Torus* of ¾ and one liſt of ⅕: of the aforeſaid parts, the upper-*Cimacium* is 22 ½ minutes, divided in 7 ⅜ parts, there under is one liſt of ⅜ parts goes off from the neck; the Baſe is one half model, divided in 6 ⅓ parts, and muſt go off the ſhaft of the Column ¼ part and a ½ part: On the left ſide is the Ornament and the Capital; the Capital is high 1 model ⅙ or 70 minutes, which divided in 23 ⅓ parts; the Aſtragal is 1 ⅖ of the parts of the Capital: The Ornament is ⅕ part of the Columns height, and is 2 models; this divided in 15 parts, give 5 the Architrave,

4 the Frieſe, 6 the Corniſh; the Architrave is 40 minutes divided in 12 $\frac{1}{12}$ parts; the Frieſe is 32 minutes, the Corniſh is 48 minutes, divided in 7 $\frac{3}{12}$. So much it projects, and is juſt 7 $\frac{1}{5}$ parts.

XXXI.

Here followeth the great and ſmall Impoſt with his Arch and Ornament of the principal Gate of the *Corinthian* Order: On the right ſide is the Impoſt and Arch, the Impoſt and Arch of the ſmall Bow ſtands marked with the Letter K; the Impoſt is high 33 $\frac{1}{3}$ minutes, divided in 7 $\frac{2}{24}$ parts; The ſmall Arch or Bow is high 25 minutes, divided in 9 $\frac{1}{12}$ parts; the height of the great Impoſt is 55 $\frac{7}{12}$ minutes, divided in 7 $\frac{3}{12}$; the great Arch or Bow is 30 minutes, divided in 9 $\frac{1}{12}$ parts: On the left ſide is the Ornament of the principal Gate, and is high 1 model 36 minutes; thereof the Architrave hath 32 minutes, divided in 9 $\frac{5}{6}$ parts; the Frieſe is 25 minutes; the Corniſh 38 $\frac{1}{2}$ minutes, divided in 5 $\frac{2}{5}$ parts.

XXXII.

Here is ſhewn how you ſhall leſſen the Columns; the *Tuſcan* Column is $\frac{1}{4}$ ſmaller above than beneath; the *Dorick* $\frac{1}{5}$; the *Ionick* $\frac{1}{6}$; the *Roman* or *Compoſita* is $\frac{1}{7}$; the *Corinthian* is $\frac{1}{8}$: which are to be divided in 12 equal parts, 3 of which muſt go up in a ſtraight line in the *Tuſcan* Column; of the *Ionick* 3 $\frac{1}{2}$ goes up in a ſtraight line, and the *Corinthian* 4 parts goes ſtraight up; of the *Dorick*, and *Roman* or *Compoſita*, is a meaſure between the *Tuſcan* and *Ionick*, and between the *Ionick* and *Corinthian*; the other leſſenings men may eaſily ſee how they ſhall make them in the Figure here ſet down.

XXXIII. Shews

XXXIII.

Shews how you may make the *Corinthian* Base, and the upper and under-*Cimacium*, with his Diagonal lines for inlarging the Projecture.

XXXIV.

Sheweth how the *Corinthian* Ornament is to be made, as the Architrave, Frieſe and Cornice with his Diagonal lines for inlarging the Projecture, eaſie to be underſtood; ſo draw one Diagonal line after a perfect quadrate of the whole Projecture of the Cornice; and in theſe Diagonal lines muſt all the Perpendicular lines come for the members that are in the Projecture; and this outermoſt end muſt we then after this meaſure draw with the ſaid Diagonal, ſo that in the croſſing, you make right Angels, that the height of the drawing members be parralel near to the Diagonal.

XXXV.

This is the Ornament of the *Corinthian* Order of the principal Gate, and is 1 model 36 minutes high, (as before is declared) thereof the Architrave hath 32 minutes; the Frieſe 25 $\frac{1}{2}$ minutes; the Corniſh 38 $\frac{1}{2}$ minutes; the Architrave 32 minutes, divided into 9 $\frac{5}{6}$ parts; thereof ſticks farther out as the outer-edge of the Door-ſtile 7 $\frac{2}{3}$ parts, or 8 $\frac{1}{2}$ minutes farther for Corniſhing; and let the ears of the Architrave be 17 parts long; of the fore-given parts, or 55 $\frac{1}{2}$ minutes to underneath, beſides all other the Corniſhing of the Architraves, as you may ſee in the Figure; the Frieſe is 25 $\frac{1}{2}$ minutes, divided in 7 parts for making the *Voluta* or Scroll, and draw one line up: the fourth part, or 14 $\frac{1}{2}$ minutes frome above off right Parallels; ſo there remains 3 parts or 11 minutes for the ſtanding out beneath, and the eye of the Scroll is $\frac{1}{7}$ part, or 3 minutes and $\frac{2}{14}$ of

the

the height of the Frieſe; and draw a Line perpendicular from above to the under-edge of the ear of the Architrave, and where the lines cut croſs each other, here is the middle of your eye: ſtrike out the croſs 4 parts 16 ½ minutes near to the outſide, and 3 ½ parts, or 12 ½ minutes to the inſide, and draw your Scroll then after this manner here drawn: the Scroll or *Voluta* beneath is ⅕ part 5 ½ minutes ſmaller, as the upper-Scrol is, and is high 20 minutes, and the breadth 12 ½ minutes: divide the height in 8 parts, and draw a Parallel-line of 4 ½ parts, or 11 ¼ minutes from beneath to above, and there the Parallel-line cut croſs the Perpendicular is the middle of the eye, ſtrikes out croſs 3 ½ parts, or 8 ¾ minutes to above, and 4 parts or 10 minutes to the outſide; and there remains over 5 parts, or 12 ½ minutes to the inſide; farther all that belongs to it may you in the Figure here plainly ſee; as for the breadth of the Scroll is 2 ⅝ parts of the Cornices given parts, or 19 minutes; the other members before may be ſeen in the Figure.

XXXVI.

Here is ſhown two Chimney-mantils, with their Profile.

XXXVII.

Here is ſhown the ground of the Building of the Lord *Strozzi* ſtanding at *Florence*, the like is deſcribed in the Authors third Book in the ſeventh Chapter.

XXXVIII.

The half of the Building on the ground to be ſeen inwards of the Building of the Lord *Strozzi.*

XXXIX. The

XXXIX.

The other half with the up-rising to be seen with the foreside of the foresaid Building.

XL.

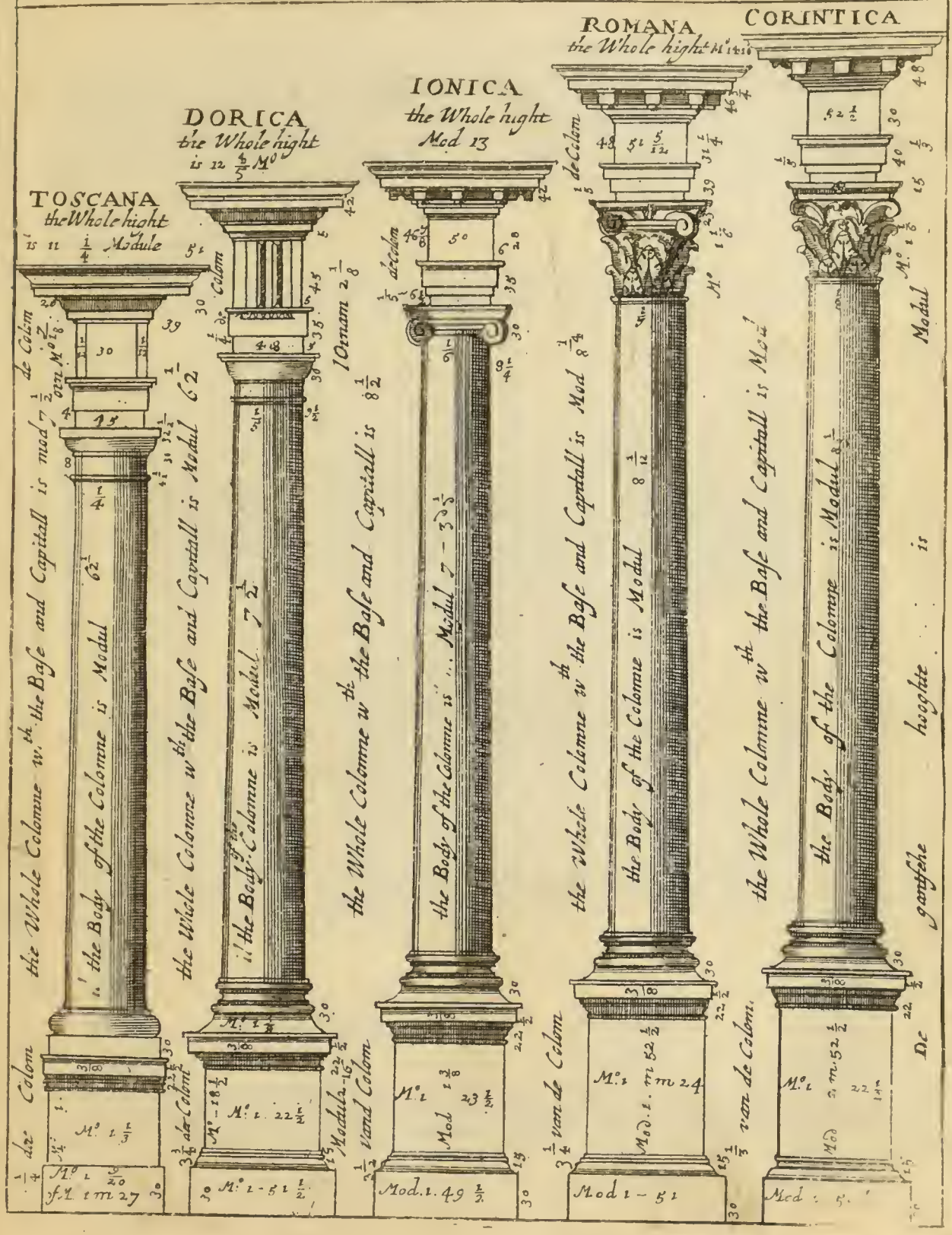
Here we have the under-side of the Cornice of all the five Columns; *A* of the *Tuscan*, *B* of the *Dorick*, *C* the *Ionick*, *D* the *Roman* or *Compositа*, *E* the *Corinthian*.

F I N I S.

Advertisement.

THe Description and Use of the Carpenters Rule, together with the Use of the Line of Numbers, and its application in measuring all Superficies and Solids; Gauging with the use of a sliding Rule, and the Joynt-Rule, by *John Browne*, and sold by *William Fisher*.

THE ORDER OF THE FIVE COLLOMNES


TOSCANA
the Whole hight is 11 1/4 Module
DORICA
the Whole hight is 12 4/5 M°
IONICA
the Whole hight Mod 13
ROMANA
the Whole hight M°
CORINTICA
the Whole Colomne w.th the Base and Capitall is mod.
the Body of the Colomne is Modul
the Wiole Colomne w.th the Base and Capitall is Modul
the Body of the Colomne is Modul
the Whole Colomne w.th the Base and Capitall is Modul
the Body of the Colomne is Modul
the Whole Colomne w.th the Base and Capitall is Modul
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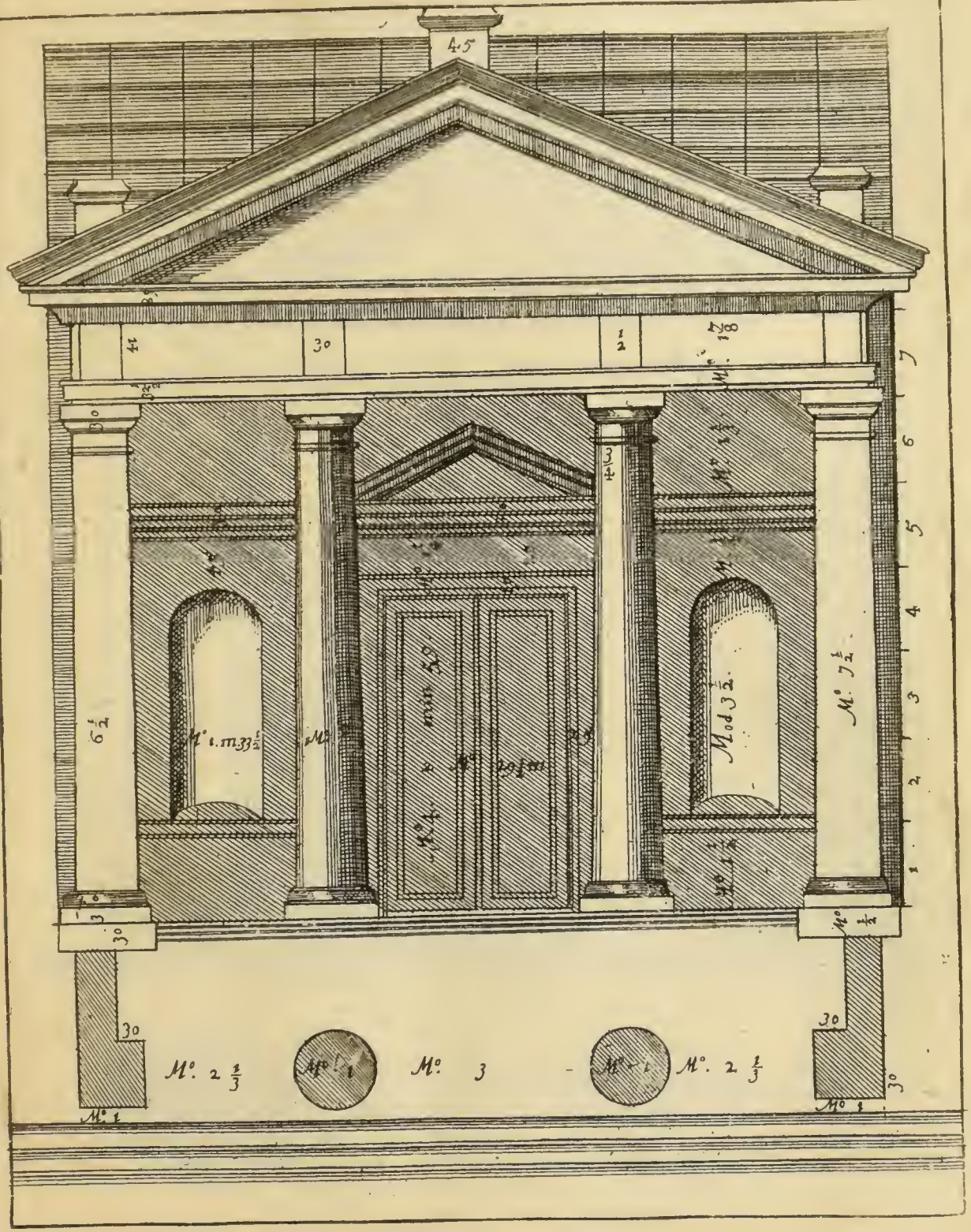
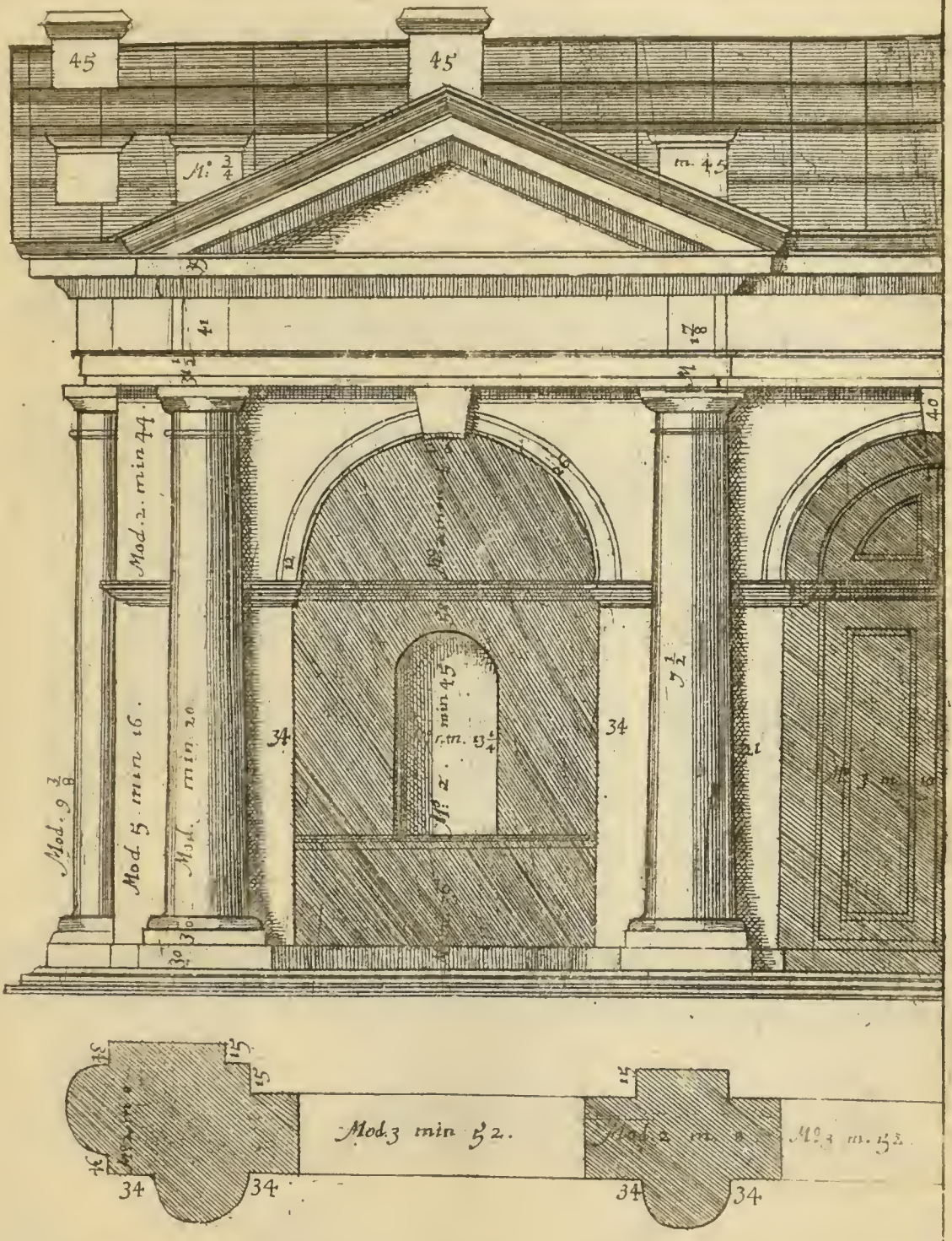
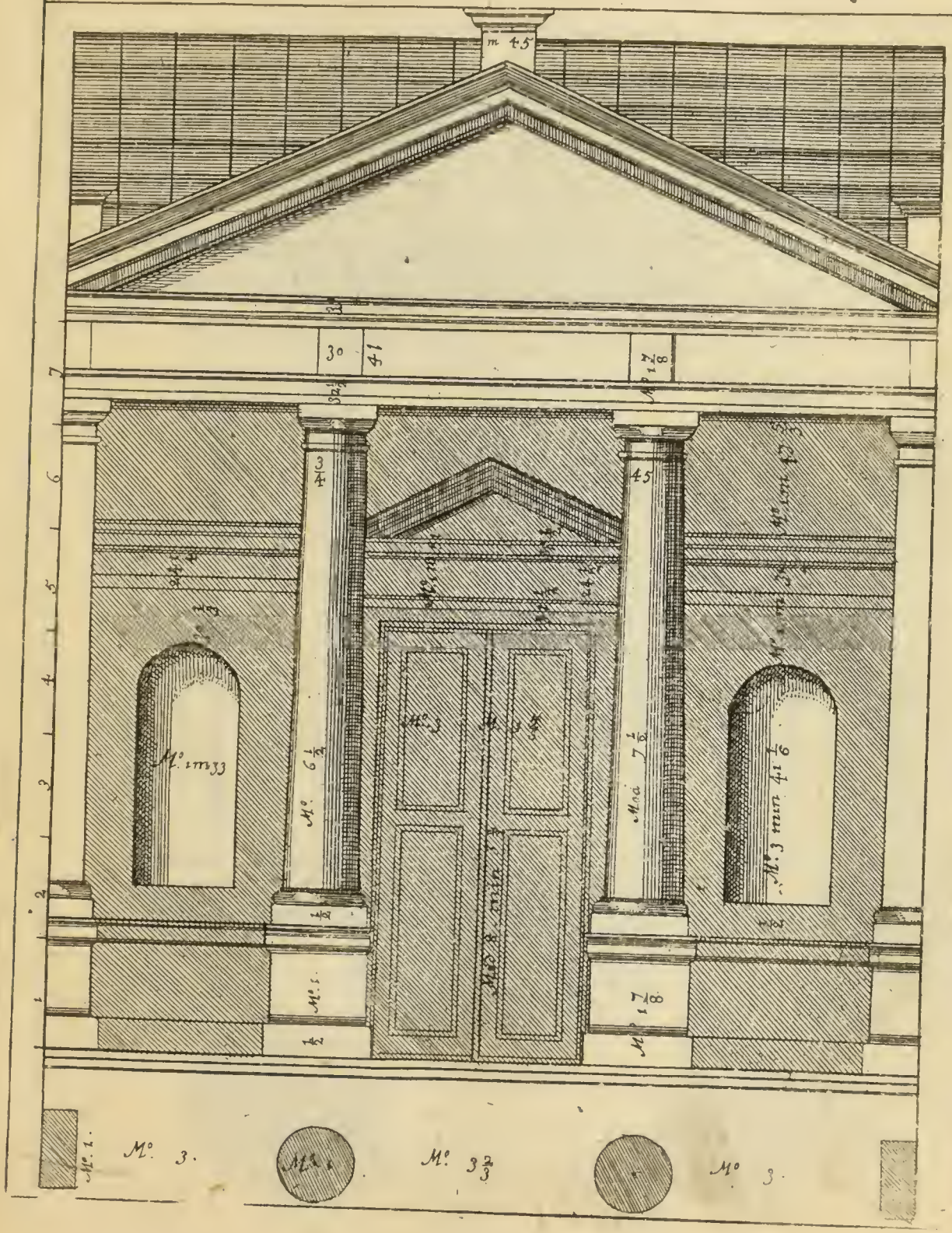
The TUSCAN Colomne



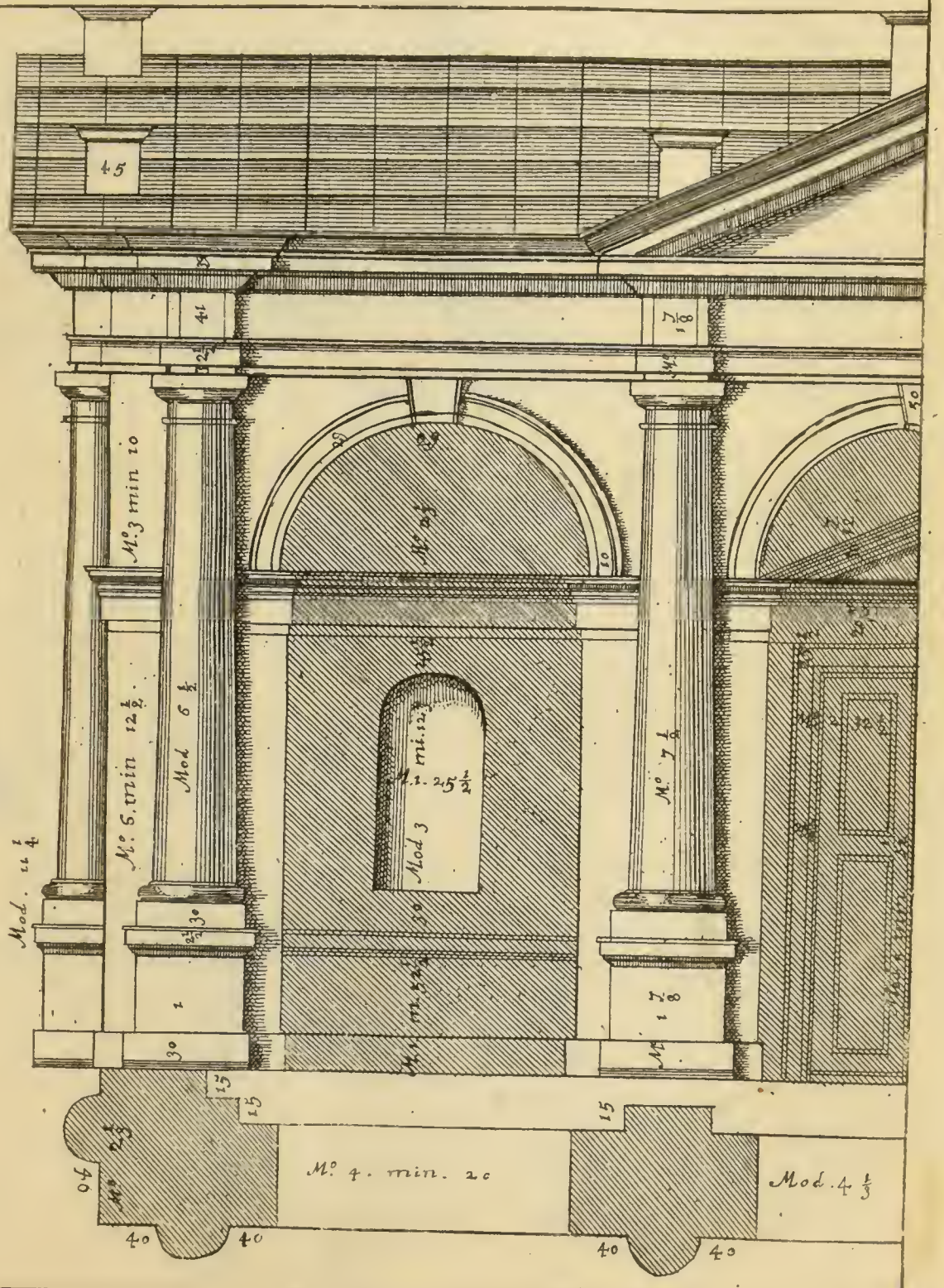
The TUSCAN Arlch



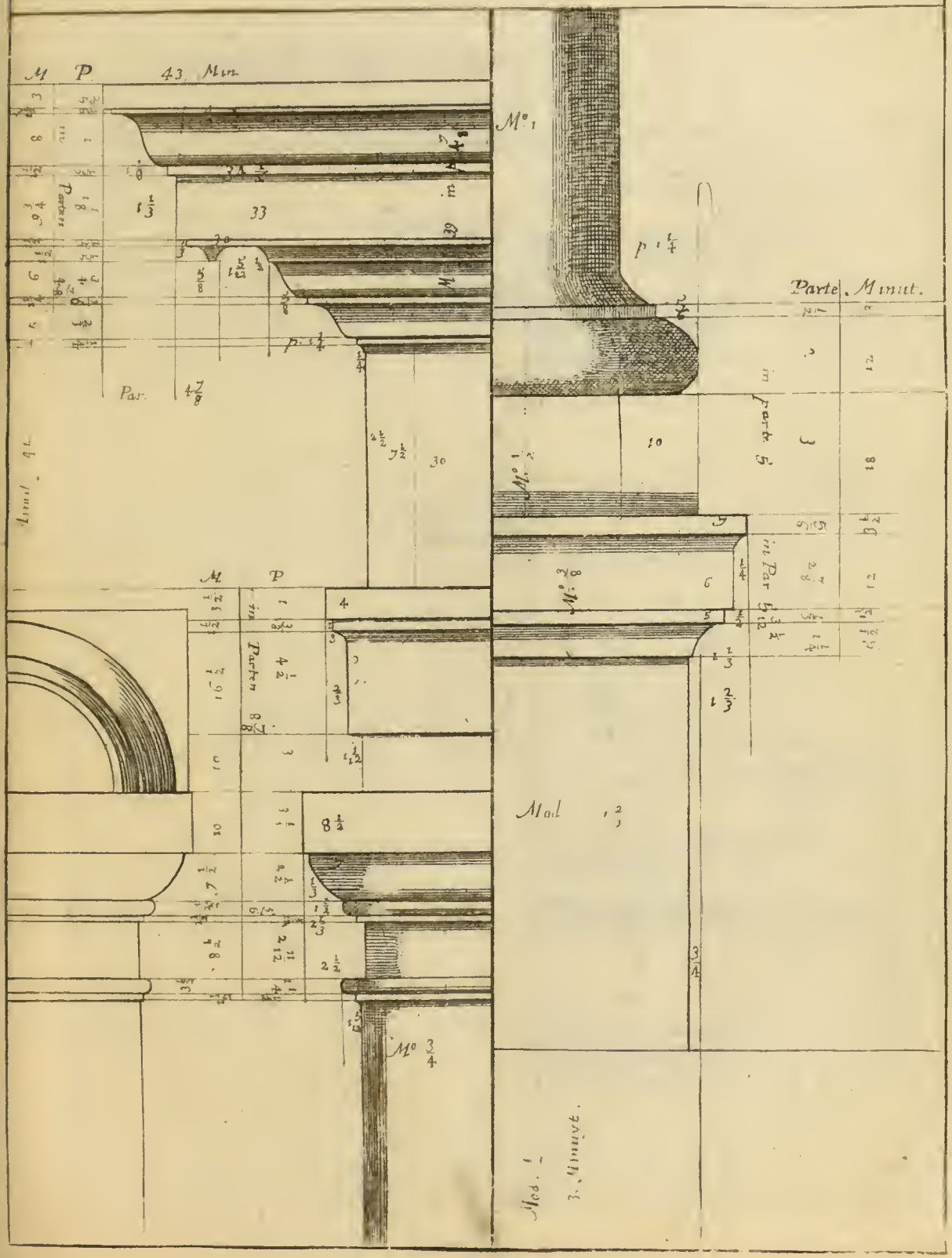
The TUSCAN Colomne with y^e Pedestall

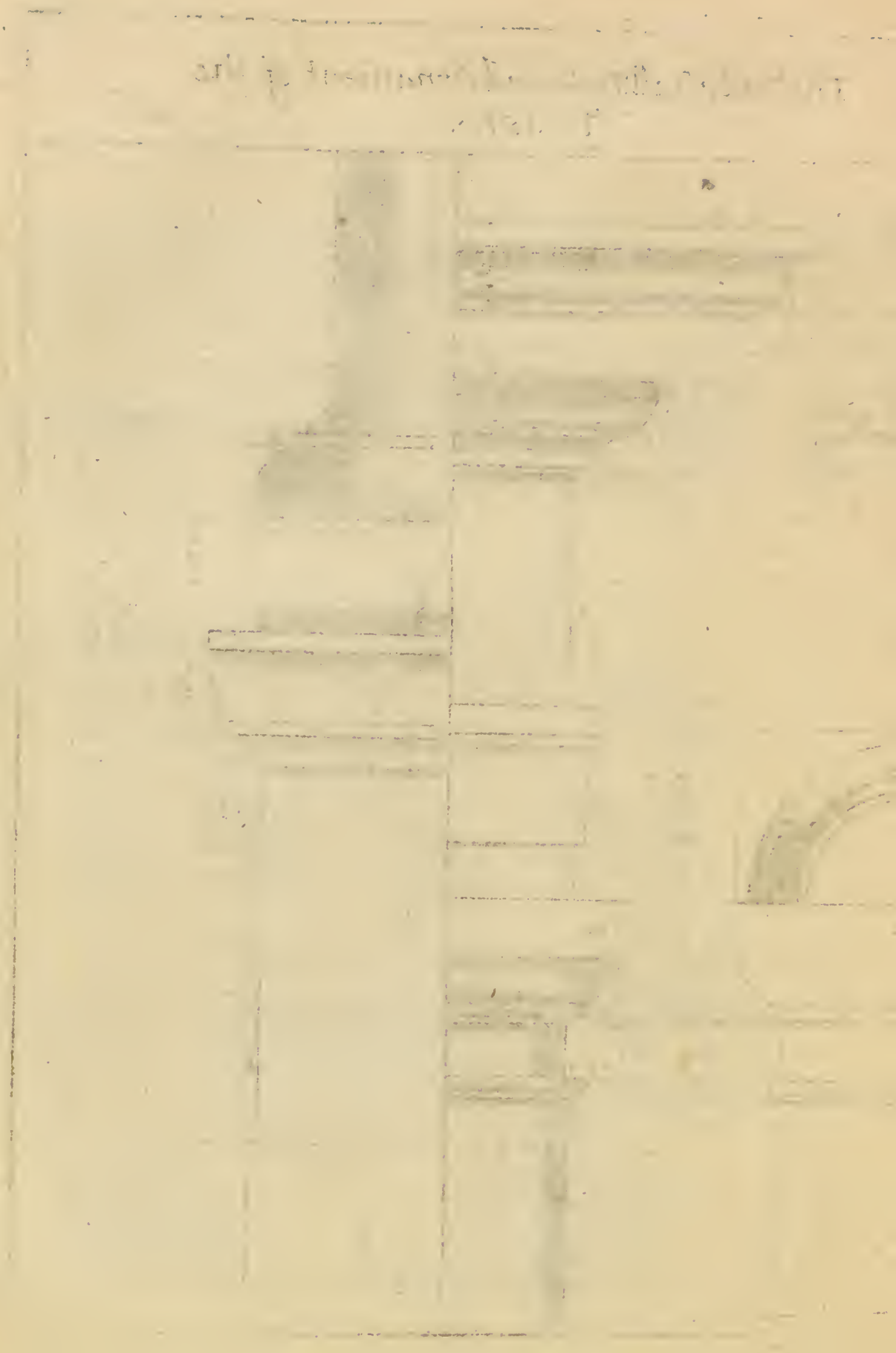


The TUSCAN Artch with Pedestall

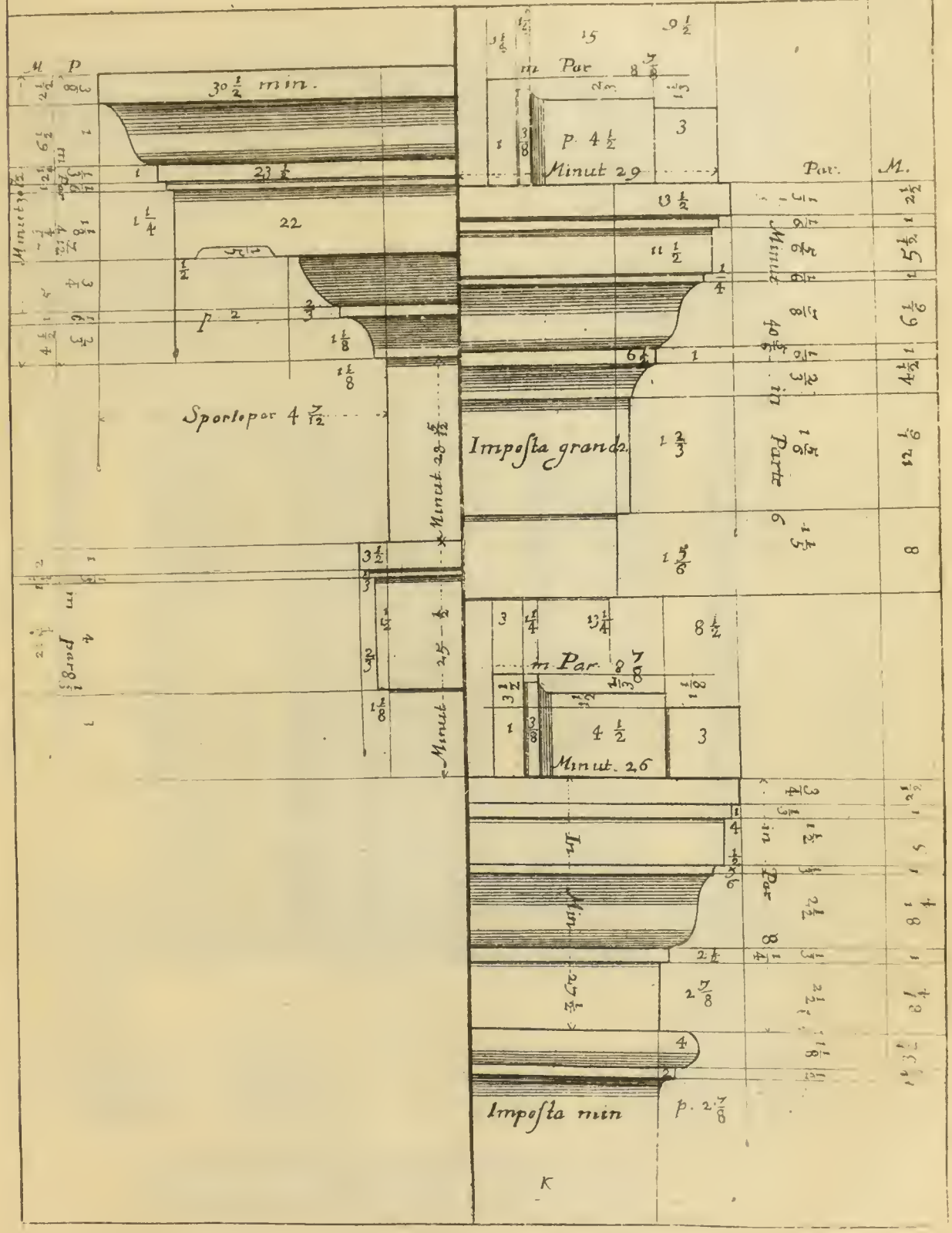


The Pedestall Base and Ornament of the TUSCAN

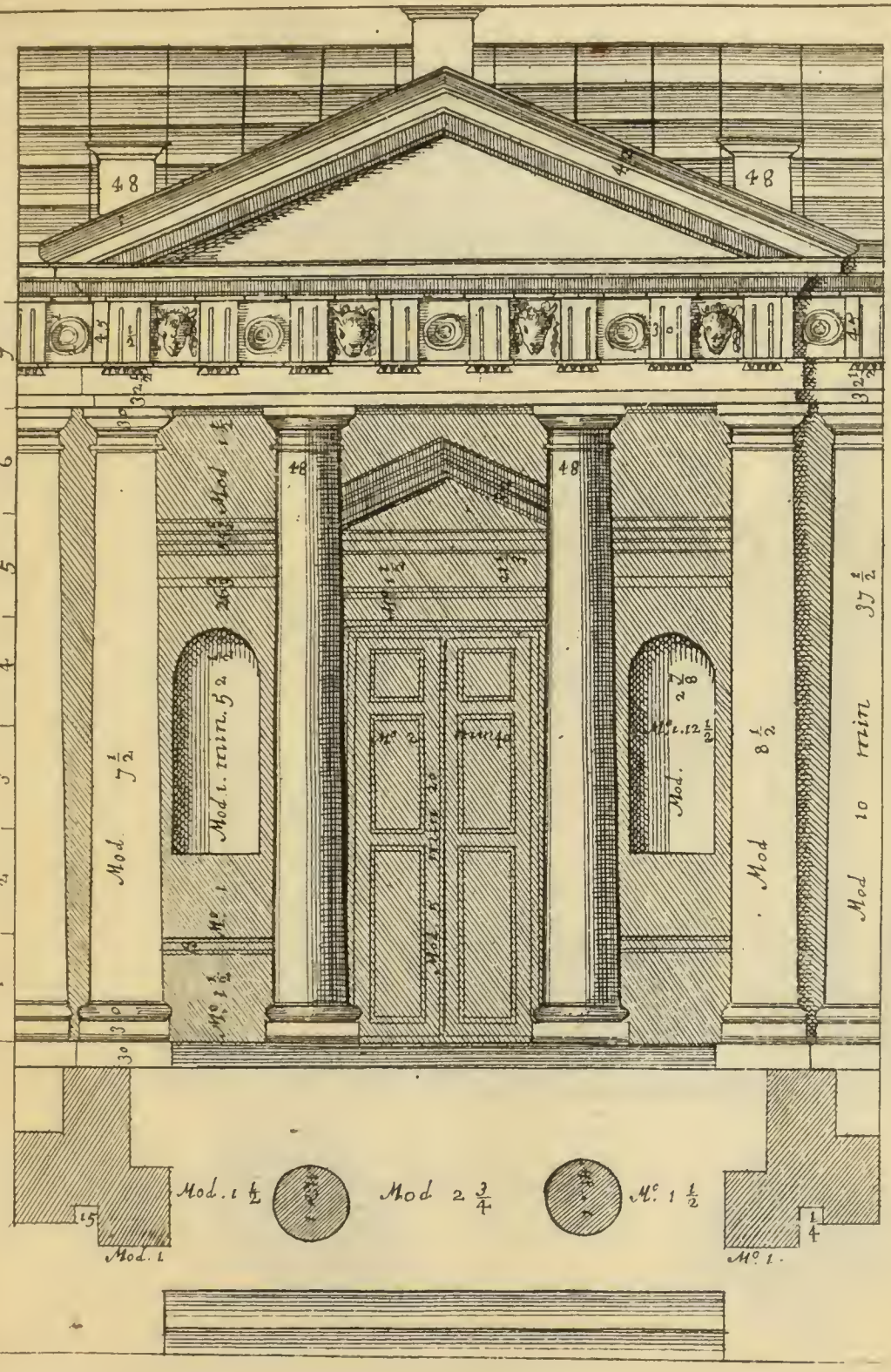




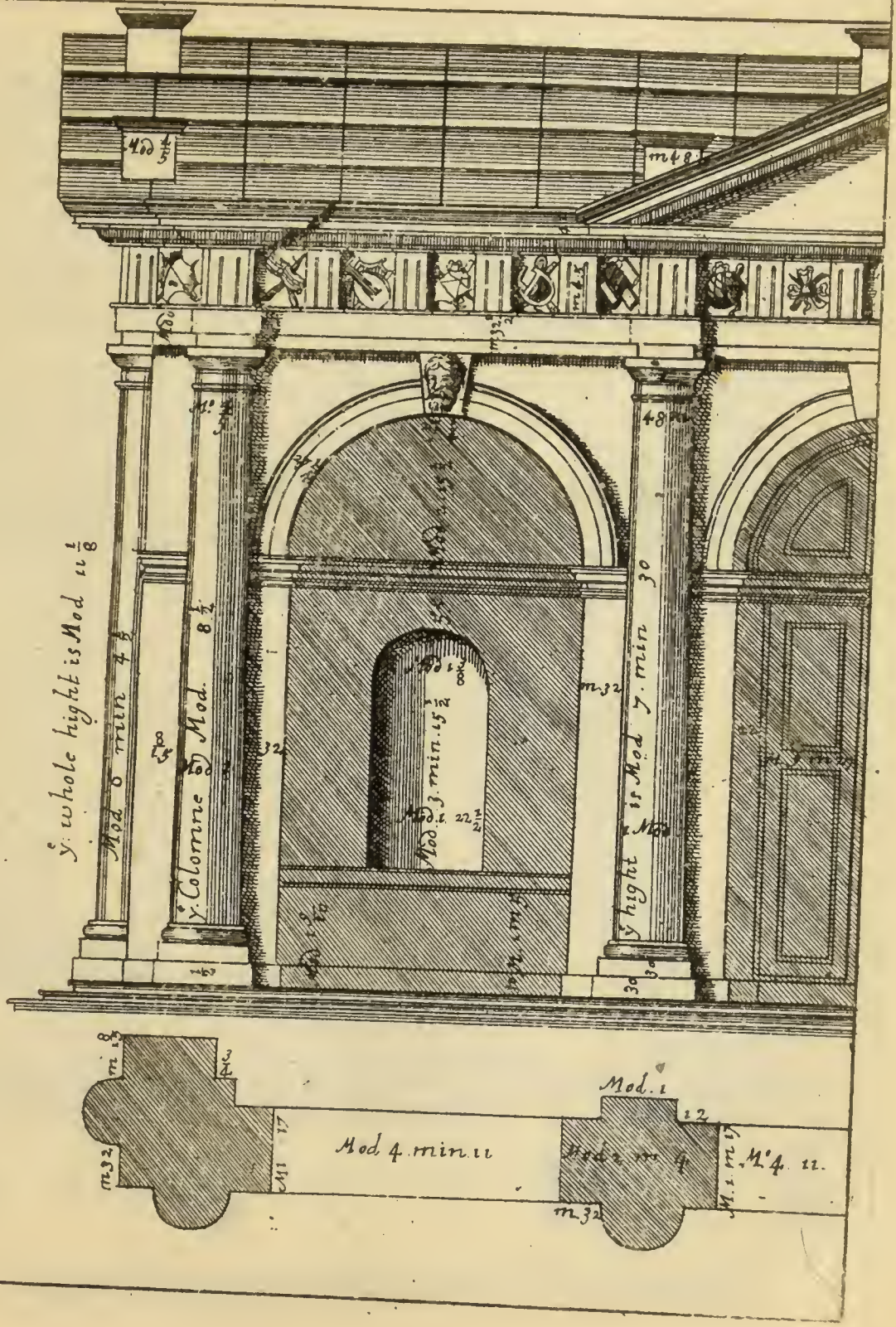
Impoſts and Ornament of y.e TUSCAN



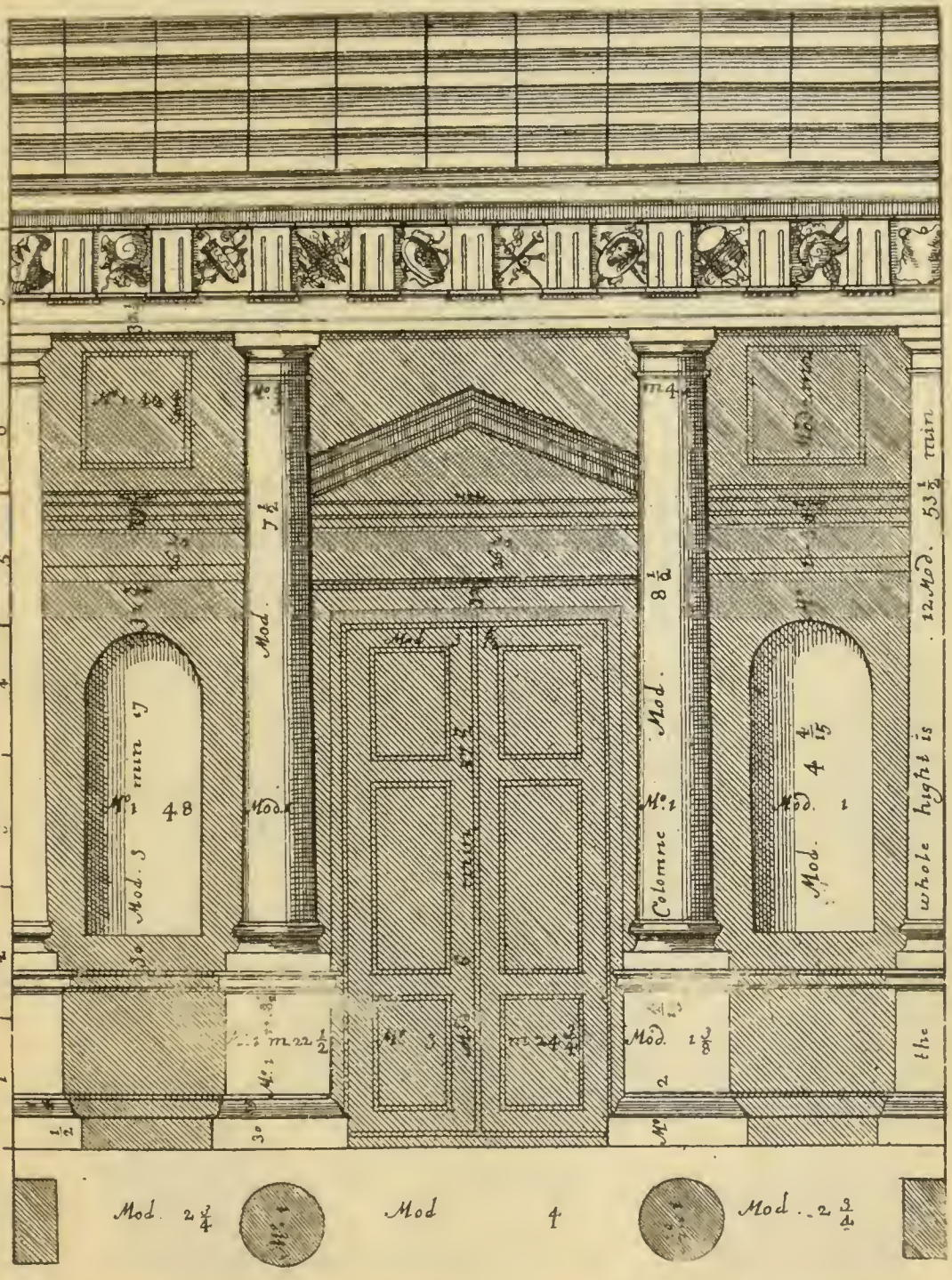
The DORICK Colomne



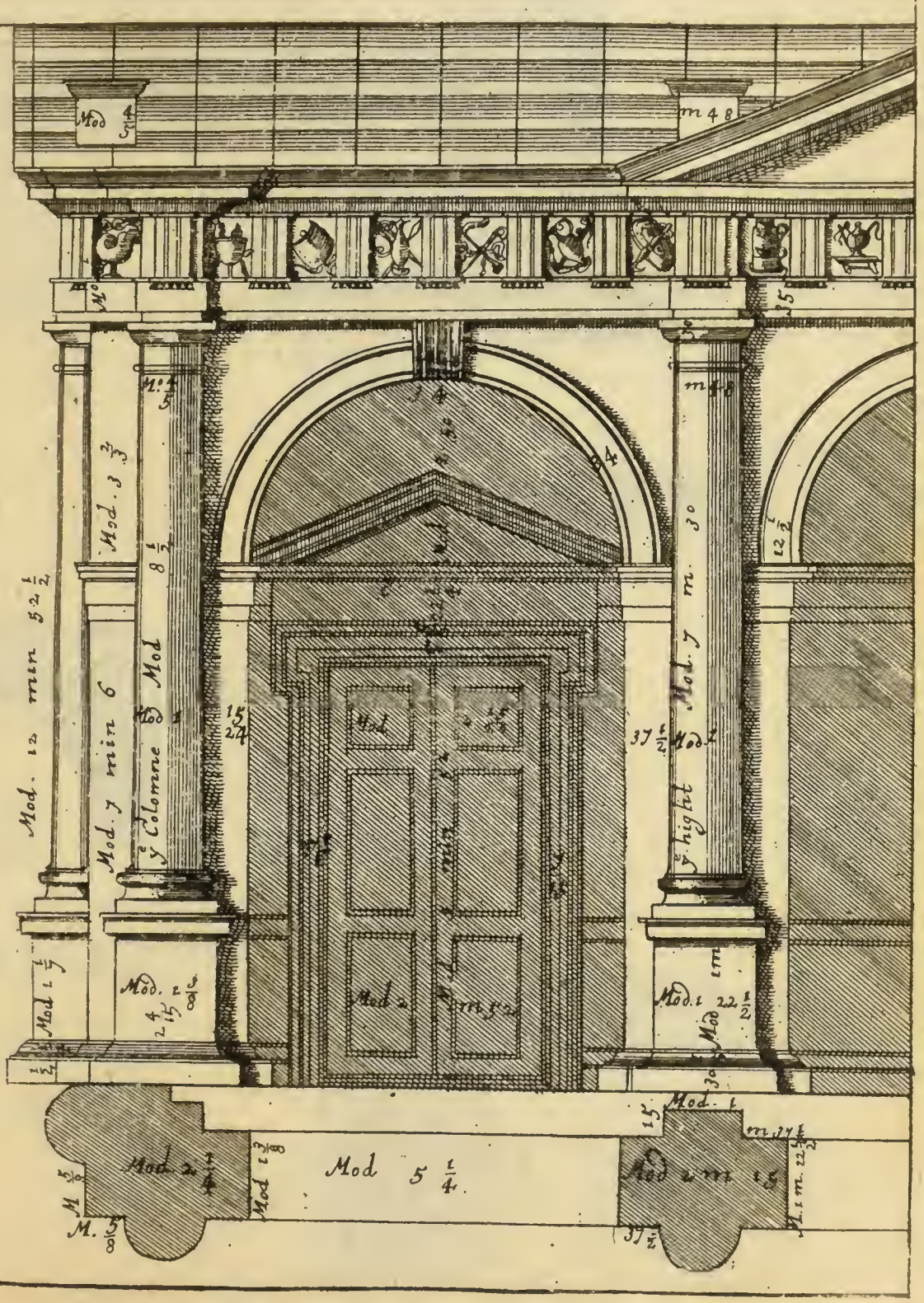
The DORICK Arch


y. whole hight is Mod 11 1/8
Mod 8 min 4 1/2
y. Colomne Mod. 8 1/2
Mod 3 min. 15 3/4
Mod. 1 22 1/2
y hight is Mod 7. min 30
Mod. 1
Mod 4 min 11
Mod 2 m 4
M. 4 11.

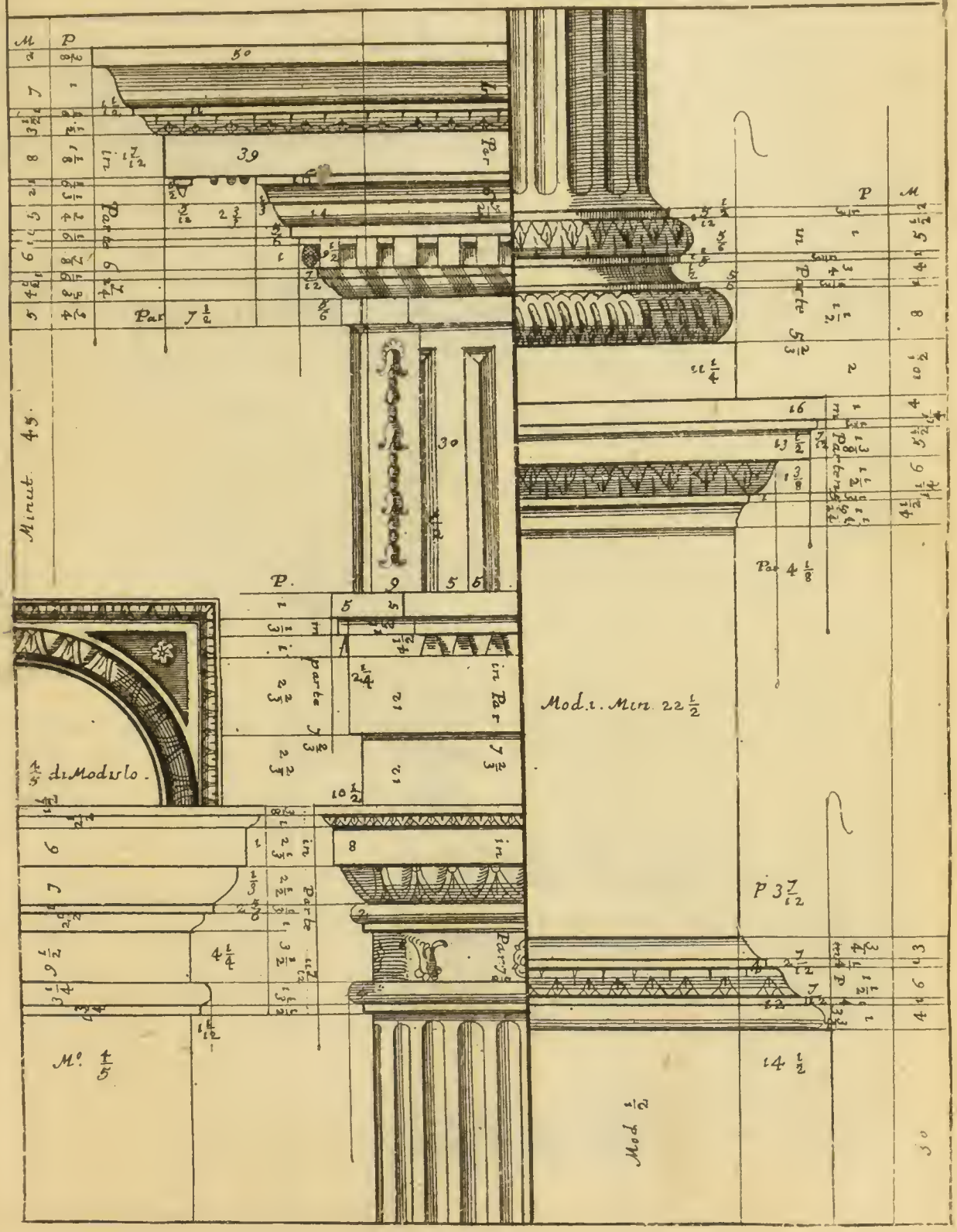
The DORICK Colomne with the Pedestall

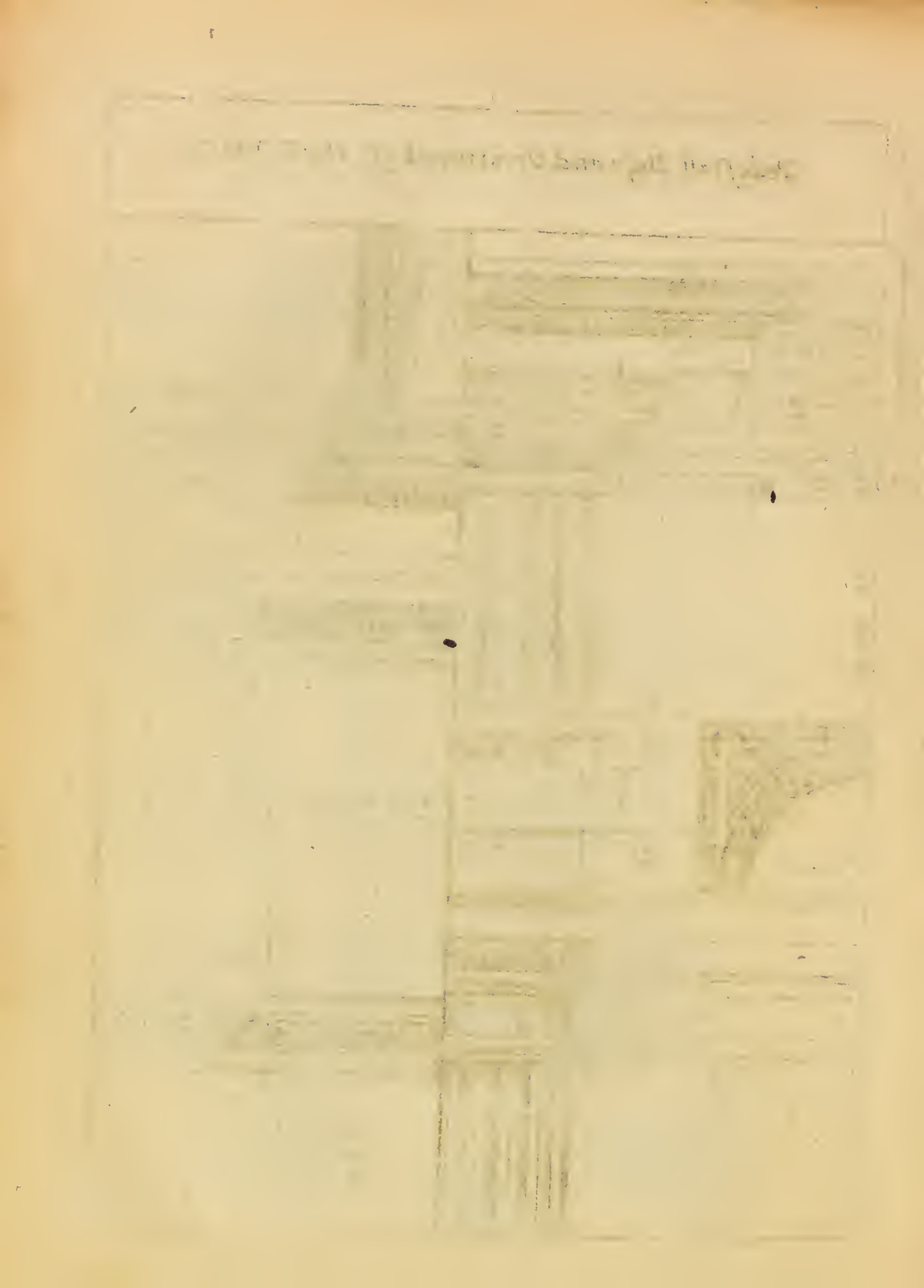


The DORICK Arch w.th y.e Pedestall

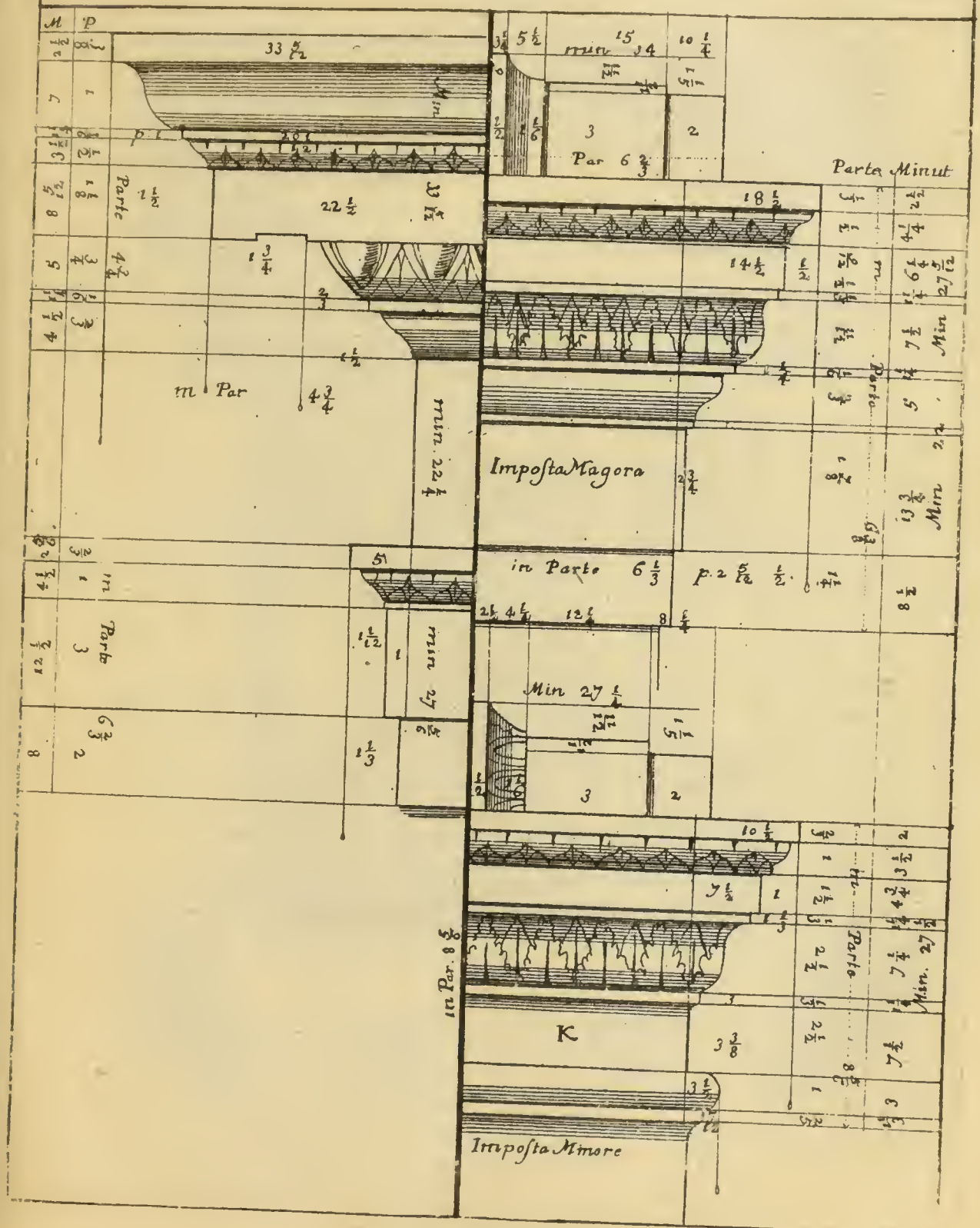


Pedestall. Base and Ornament of the DORICK

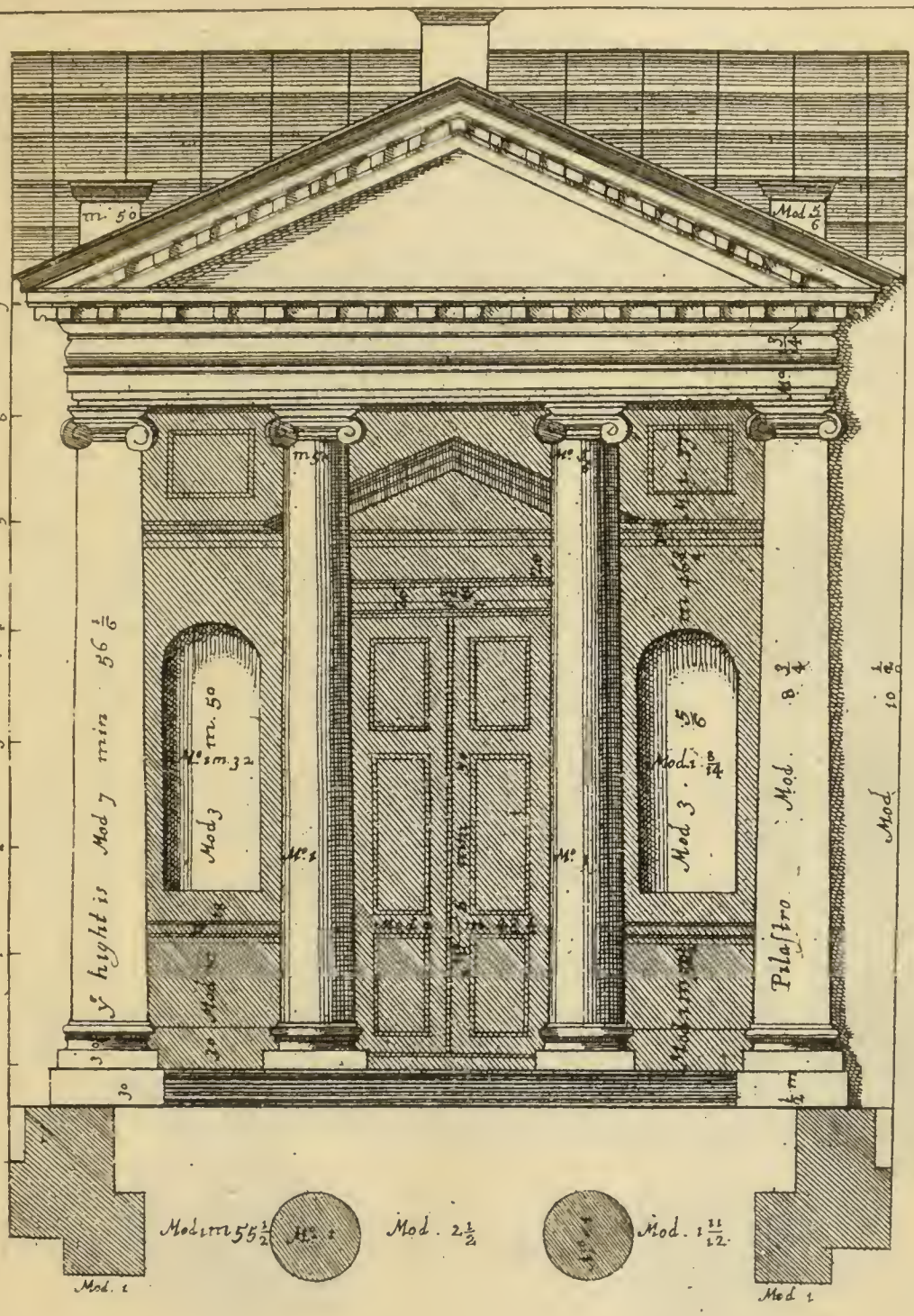




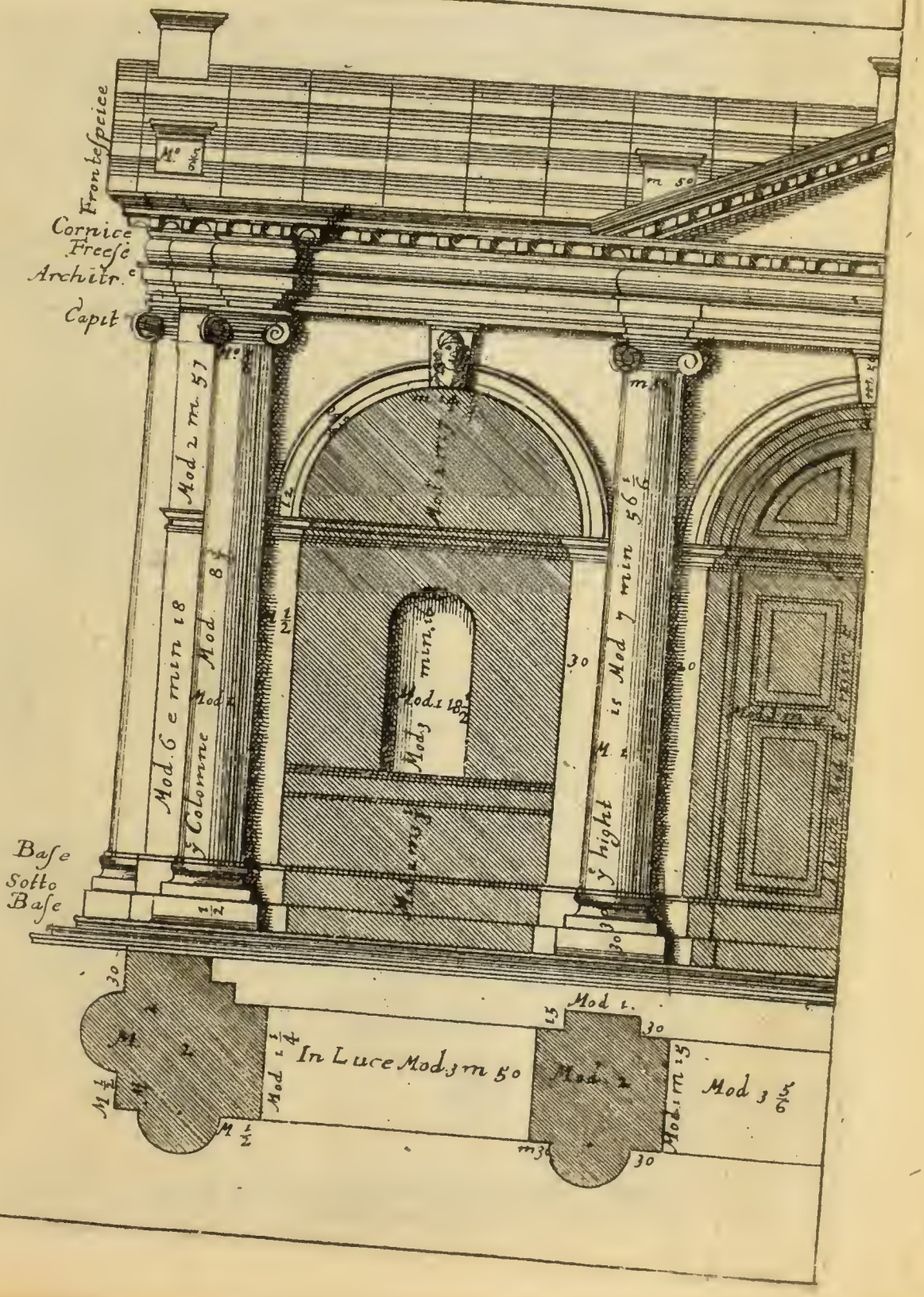
Impoſts and Ornament of ye DORICK order



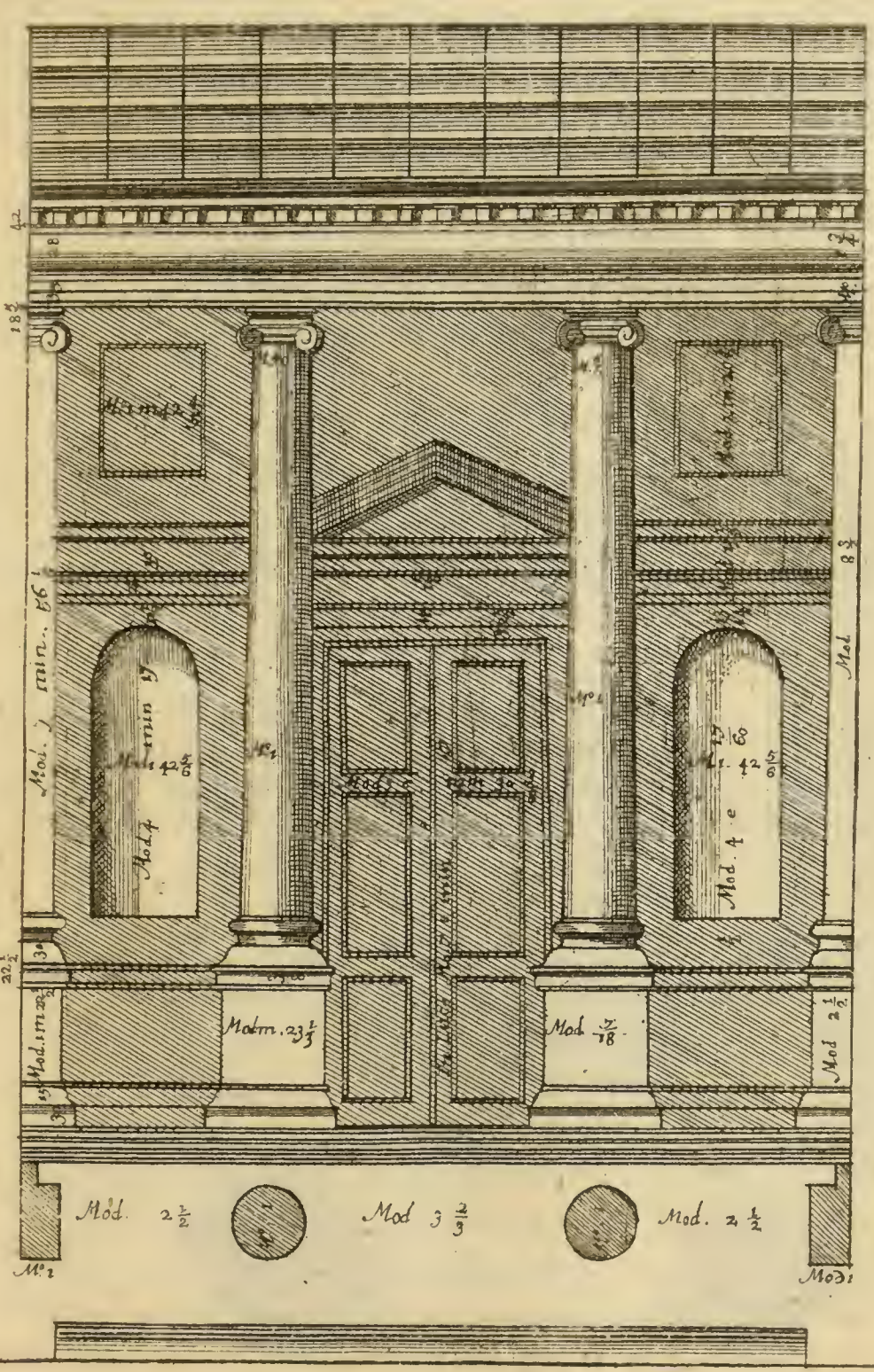
The IONICK Colomne



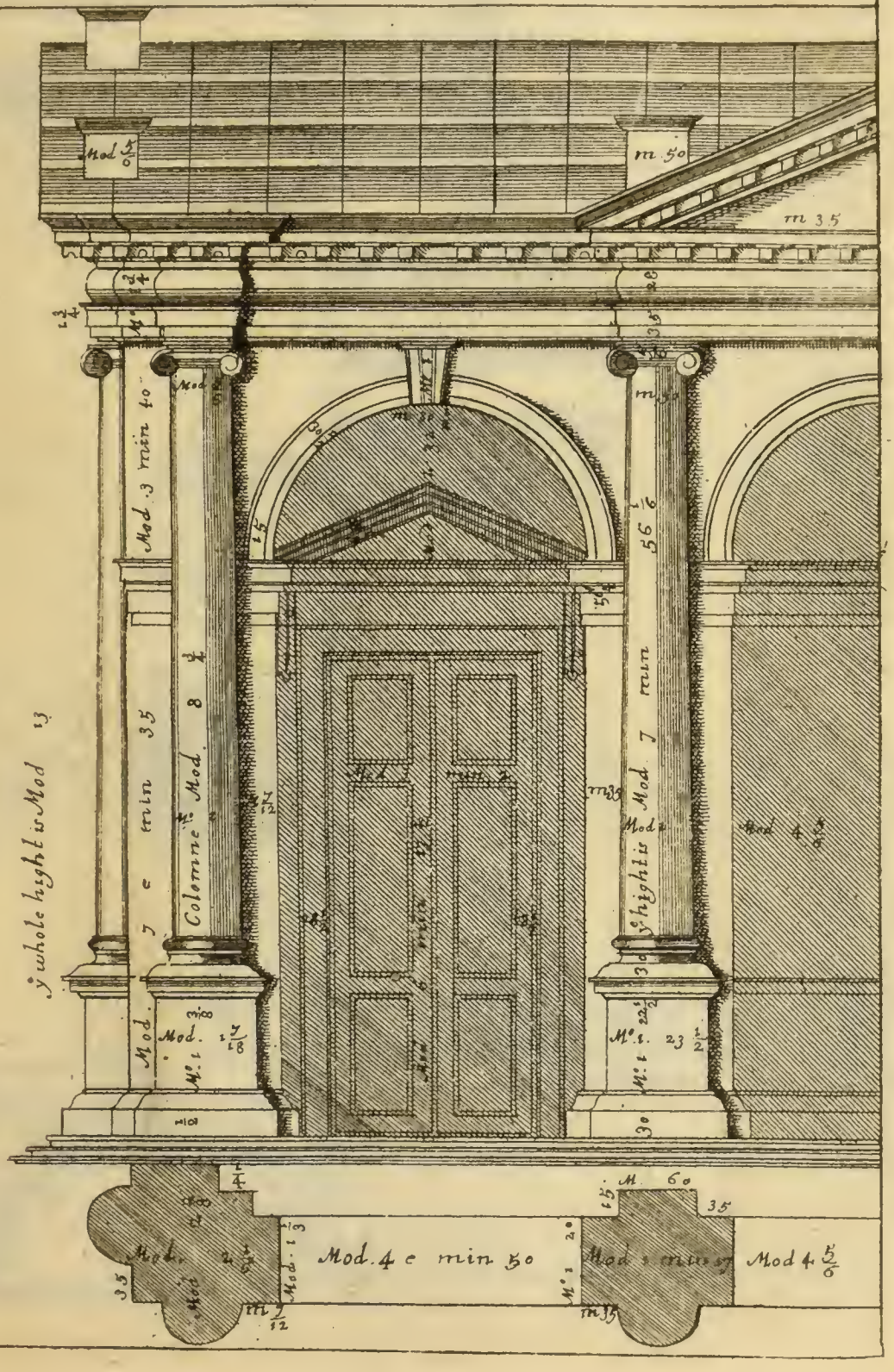
The IONICK Arch



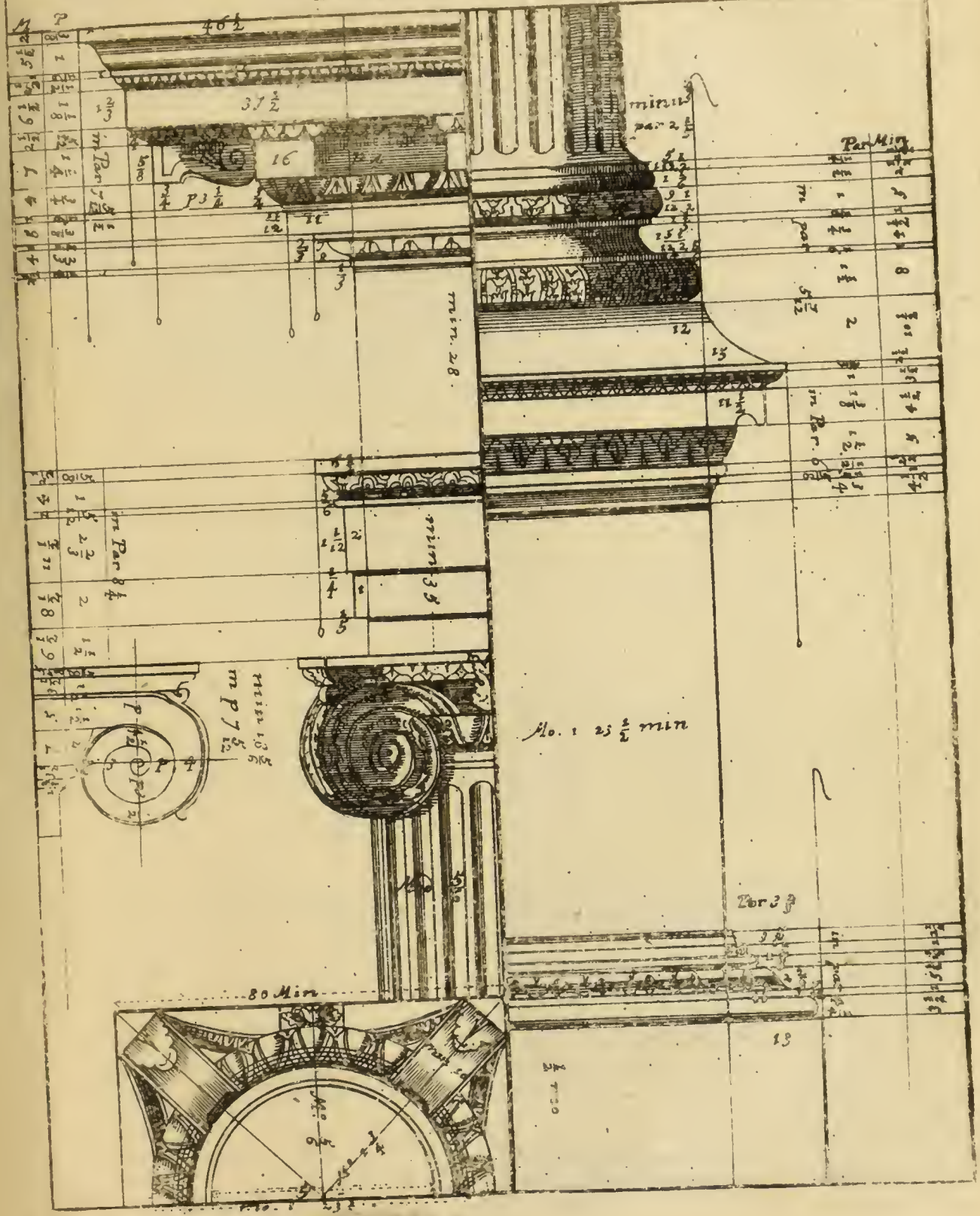
The IONICK Colomne W^th the Pedestall.



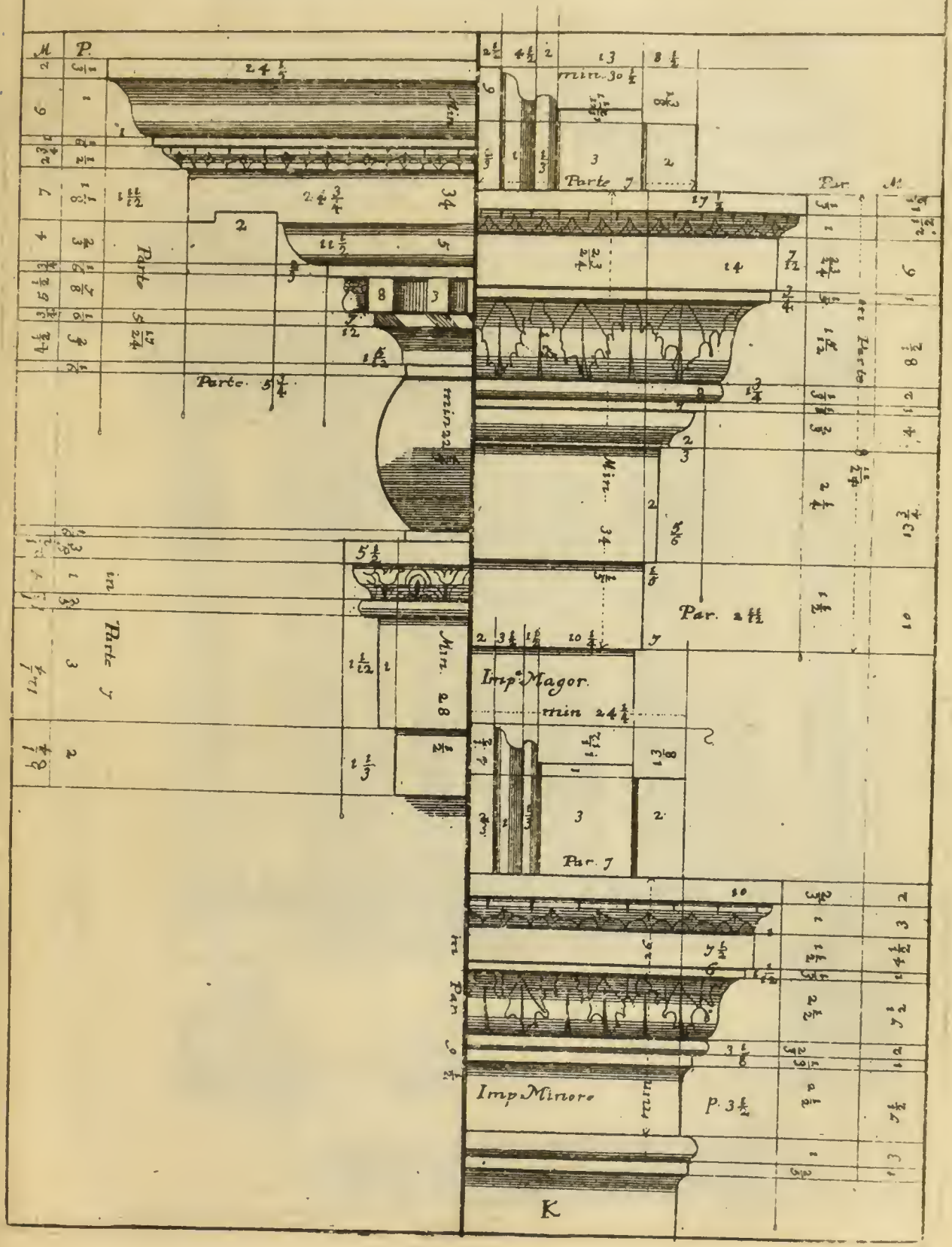
The IONICK Artch w.th y.e Pedestall

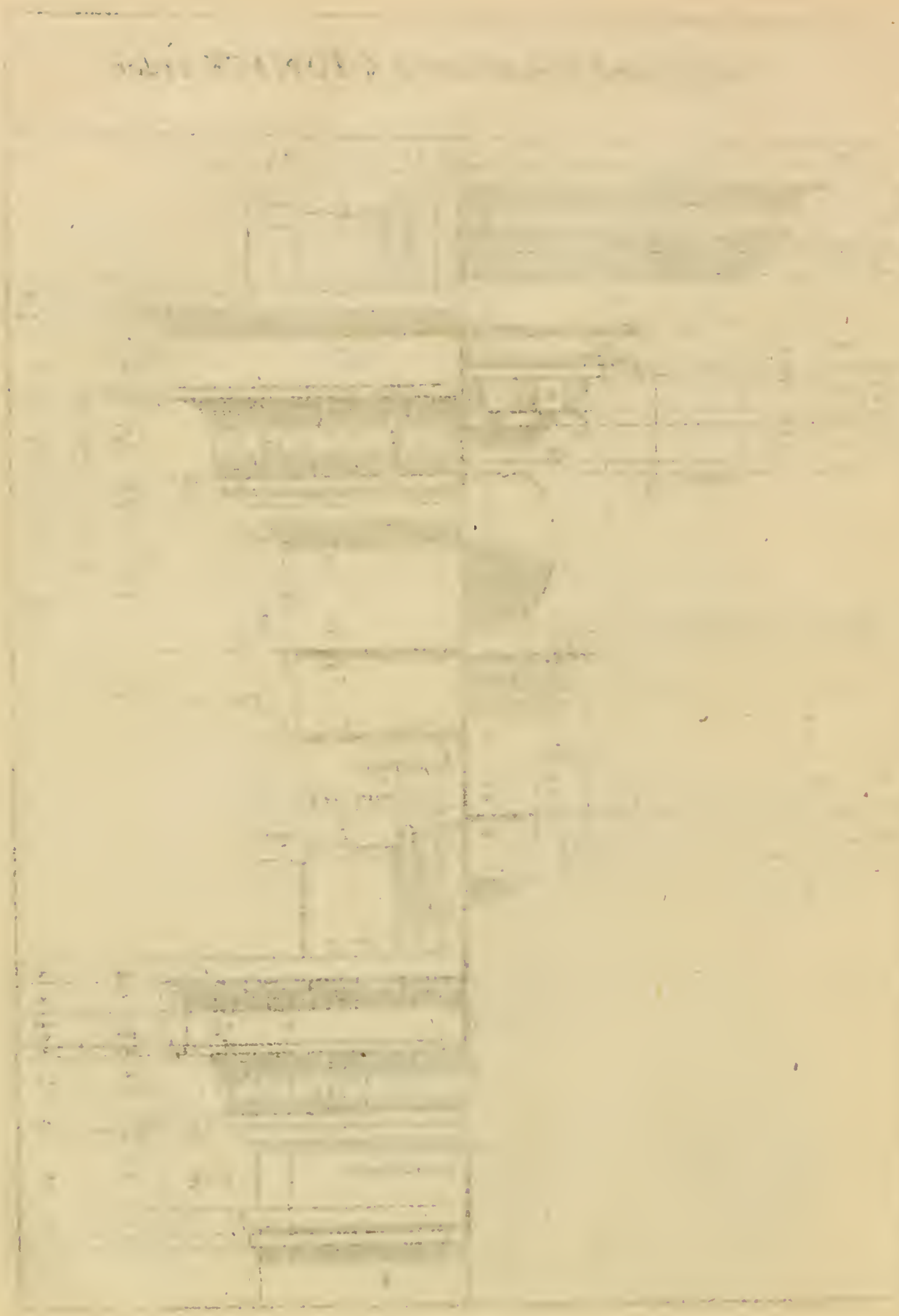


Pedestall Base and Ornament of the IONICK

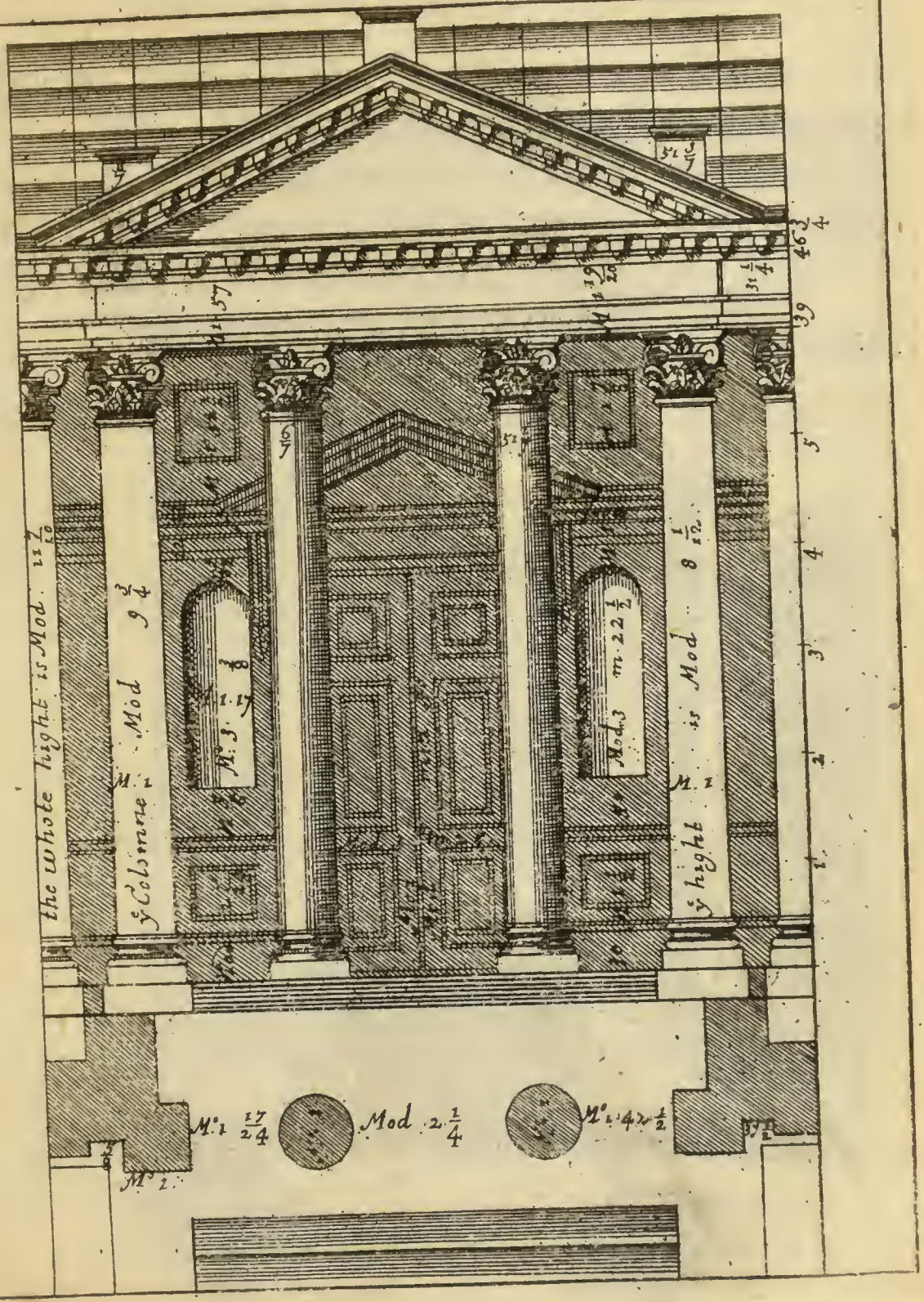


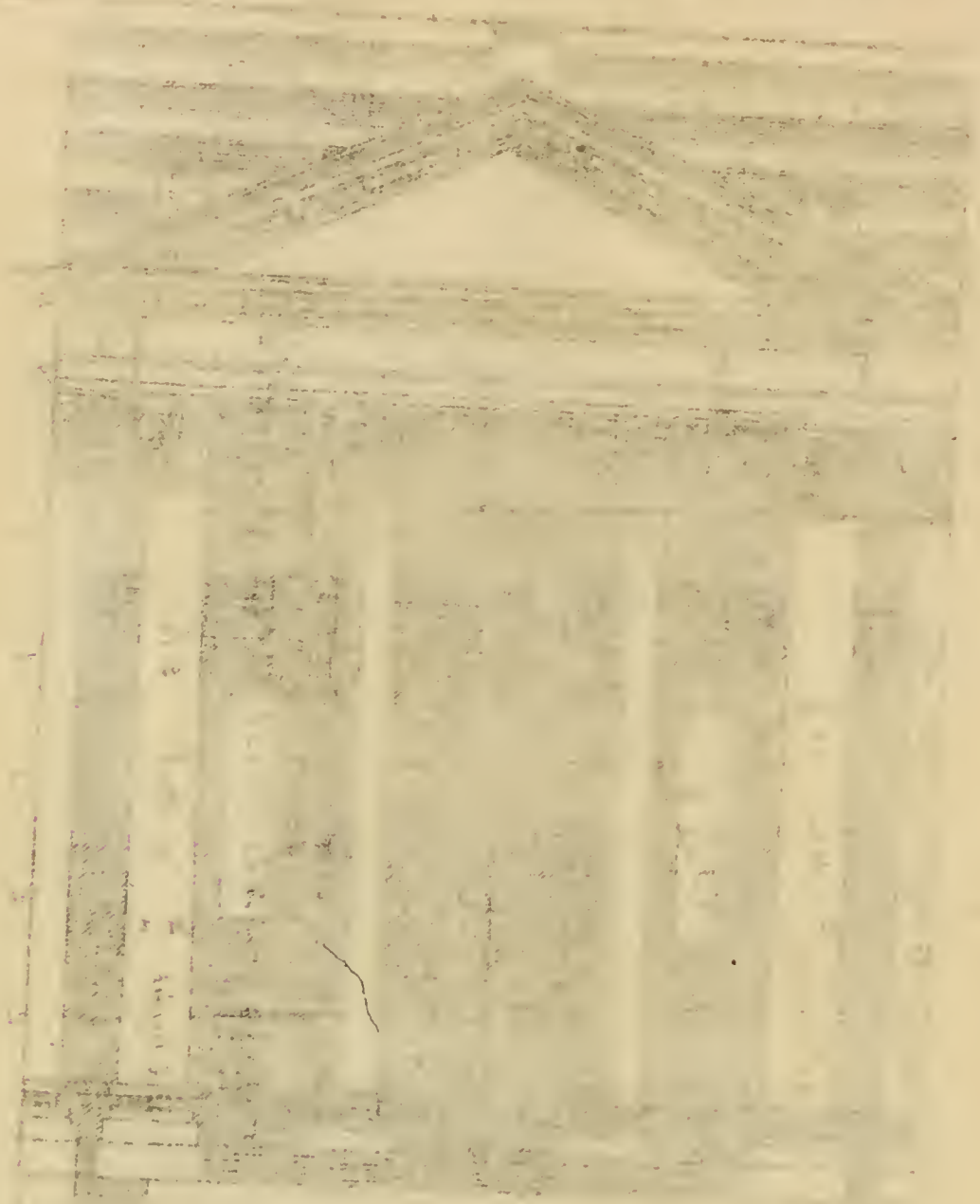
Impoſts and Ornament of ye IONICK order



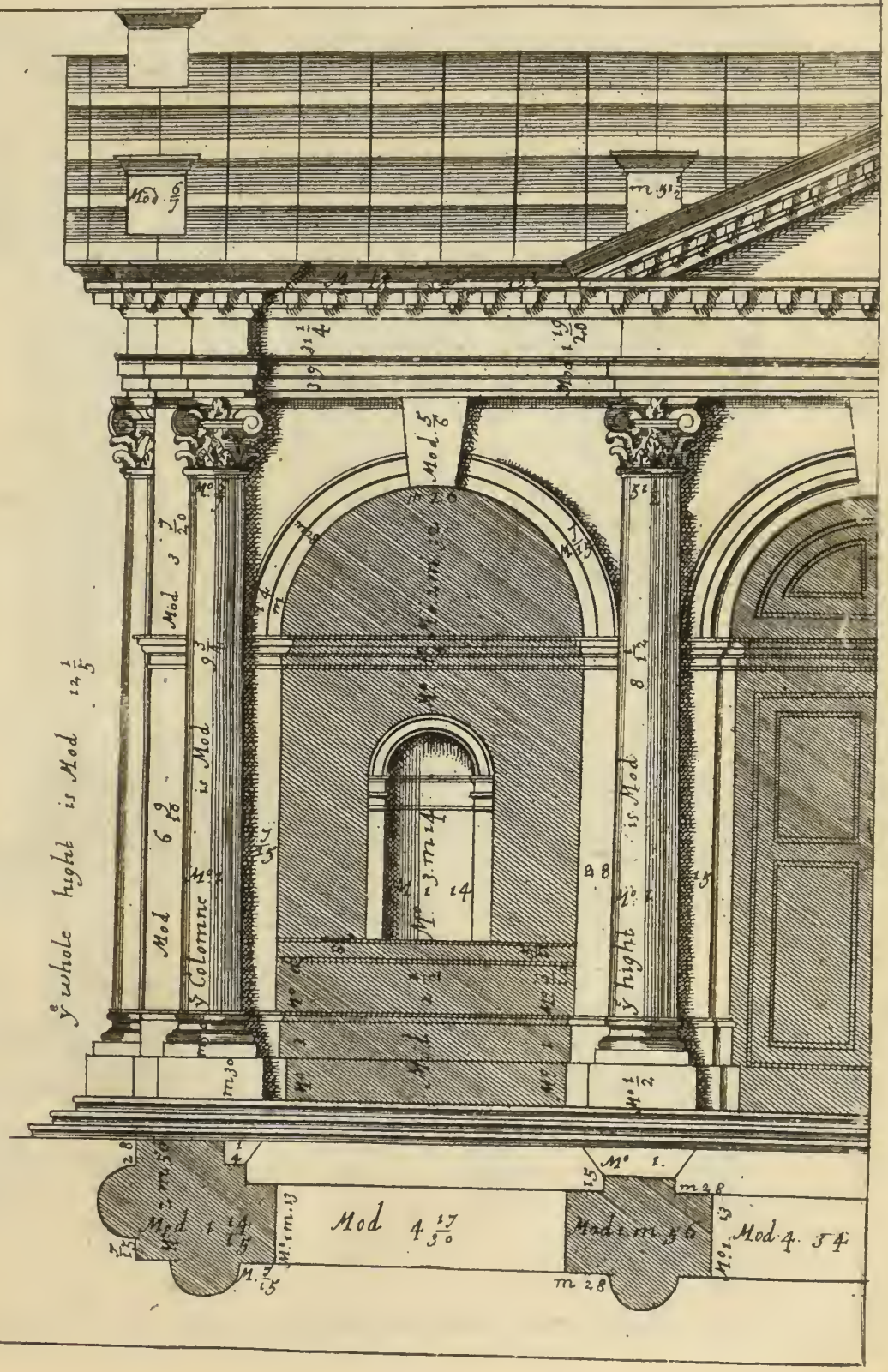


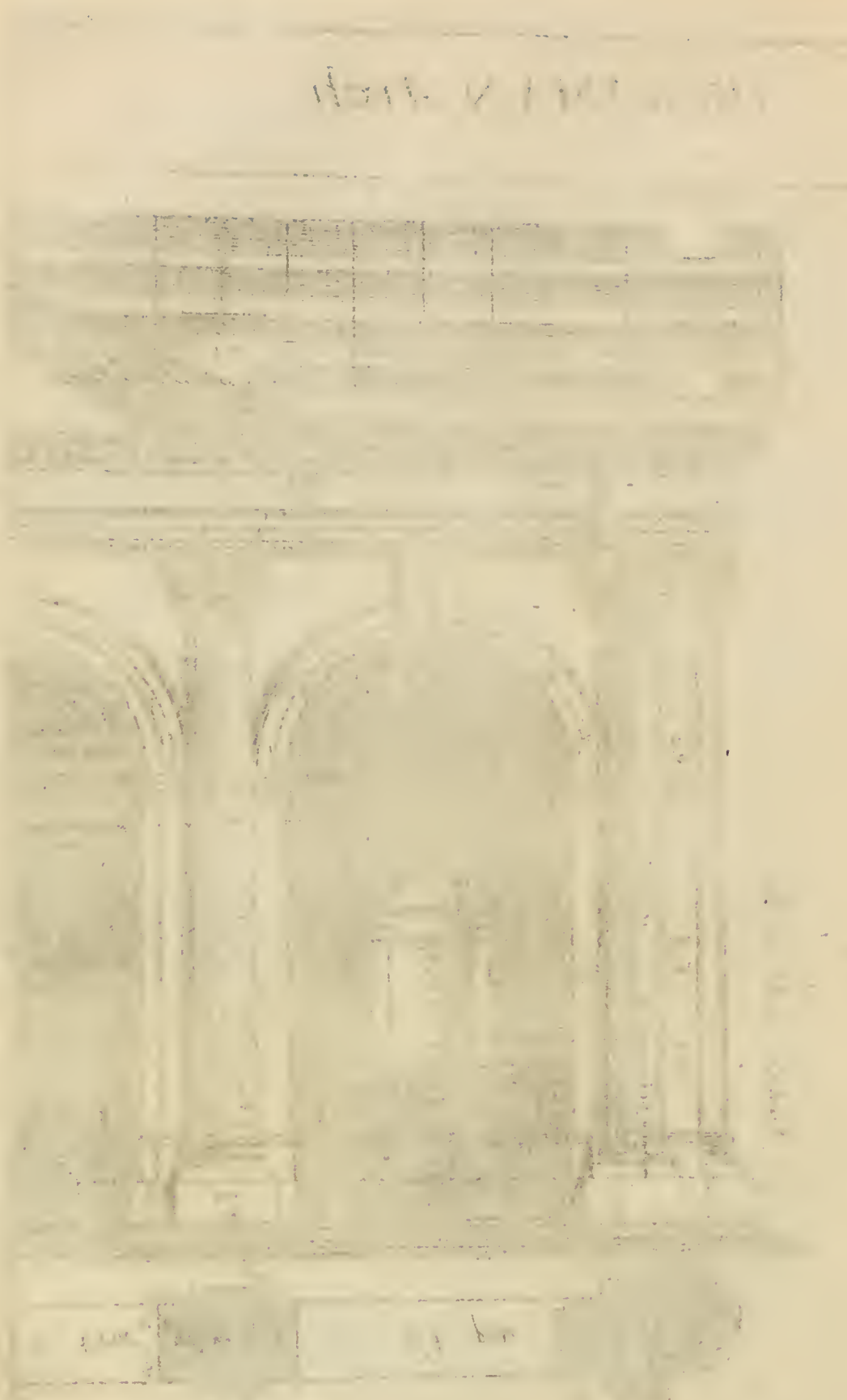
The ROMAN Colomne



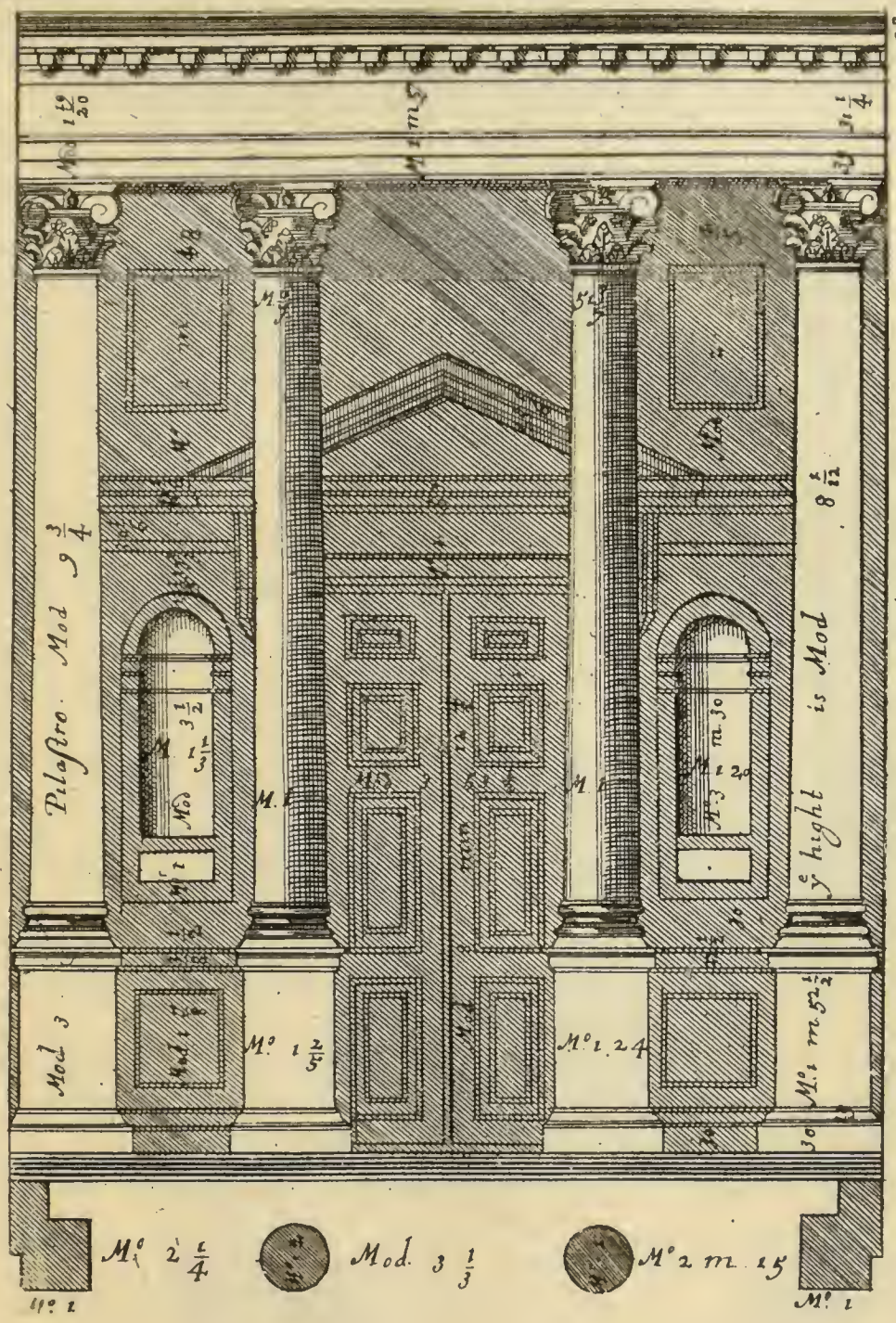


The ROMAN Arch

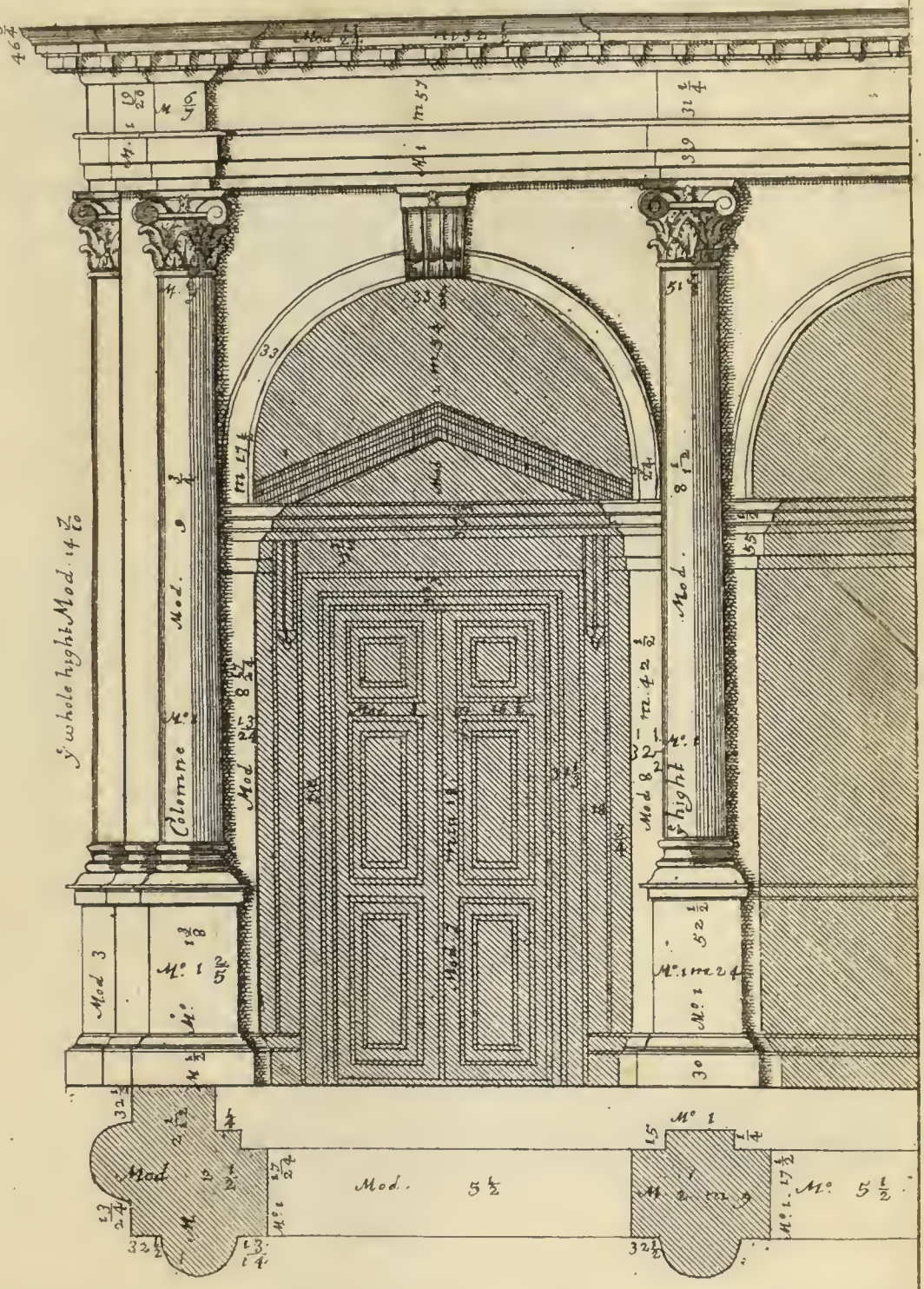




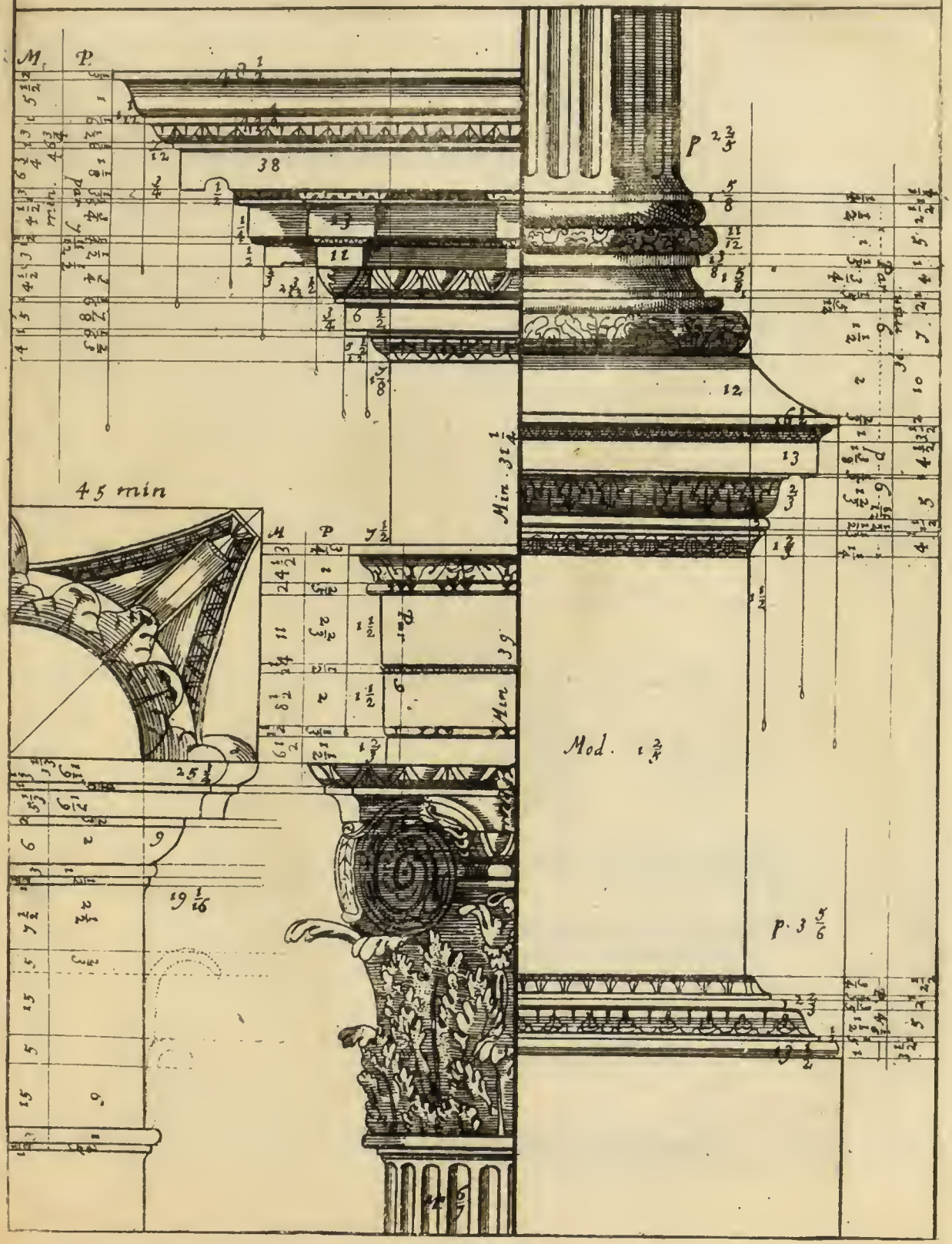
y^e ROMAN Colomne w^th y^e Pedestall

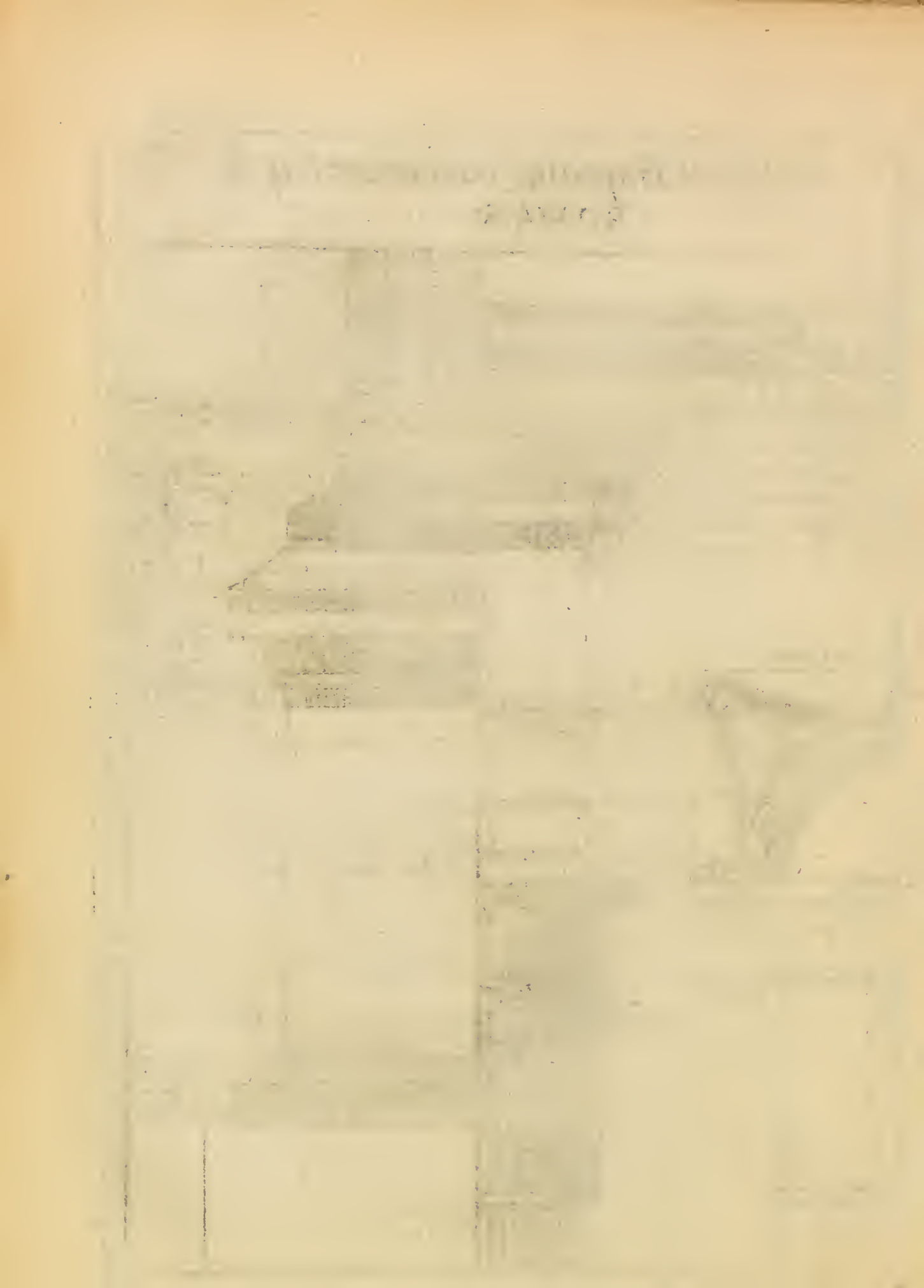


The ROMAN Artch with ye Pedestall

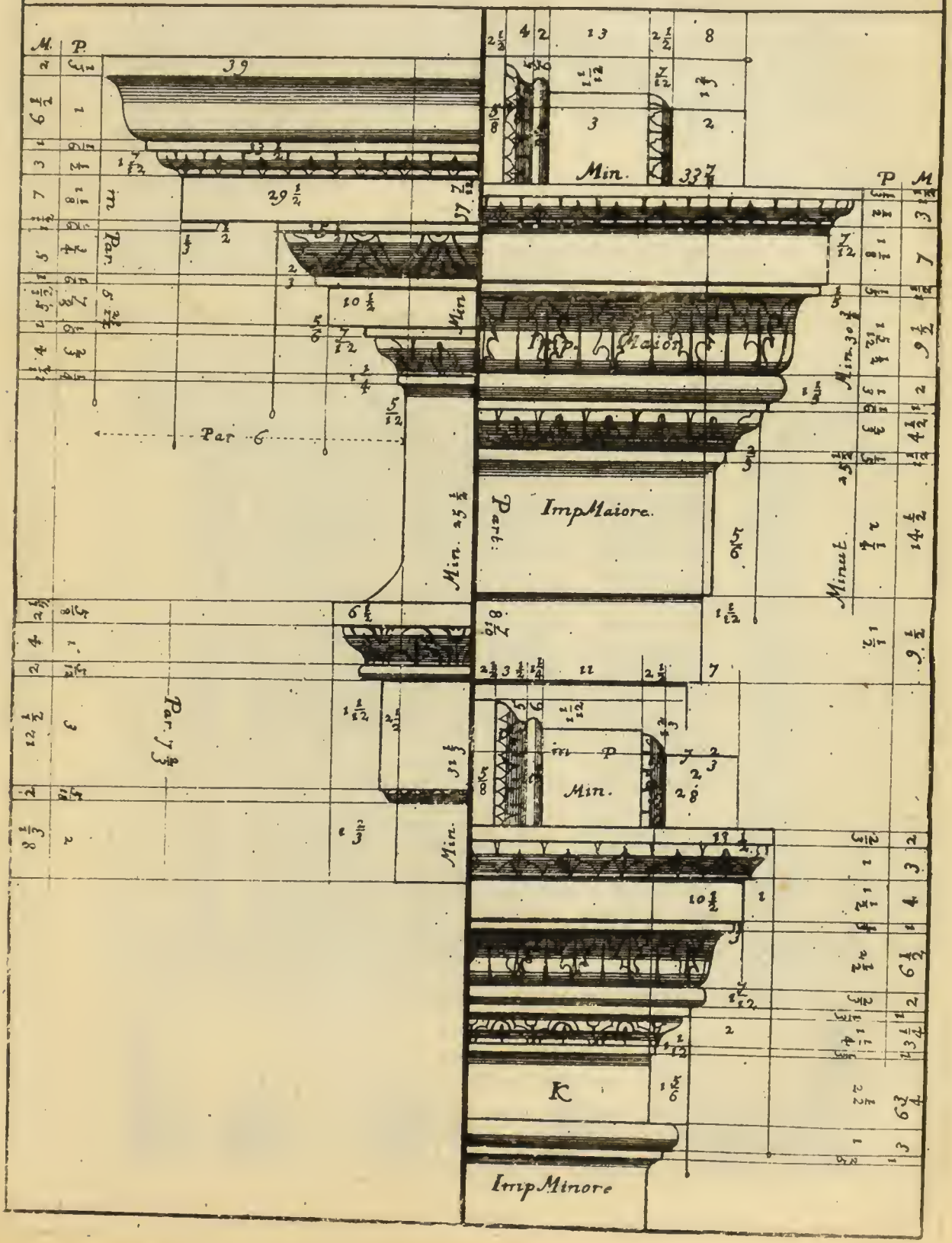


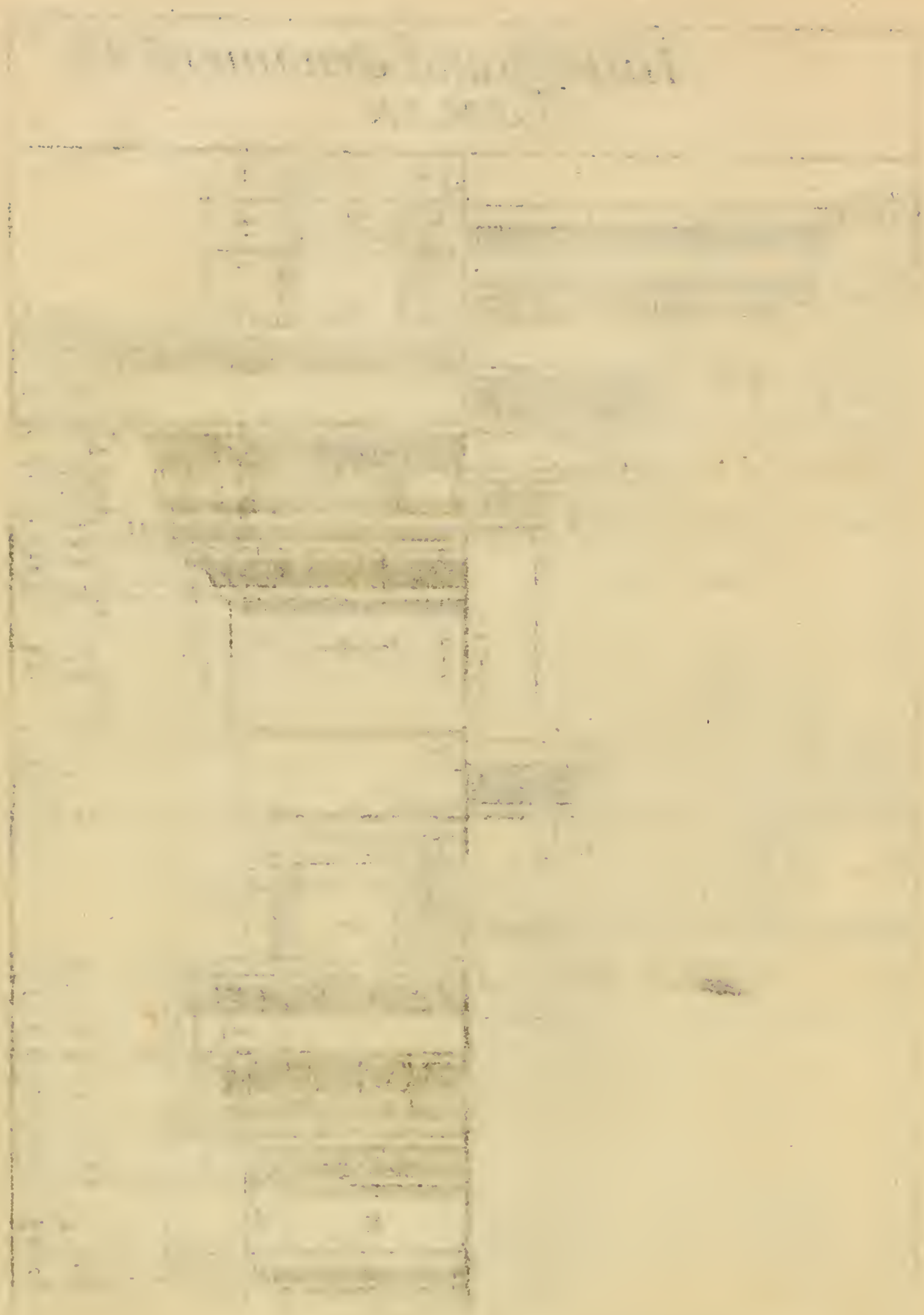
Pedestall Base and Ornament of y^e ROMAN



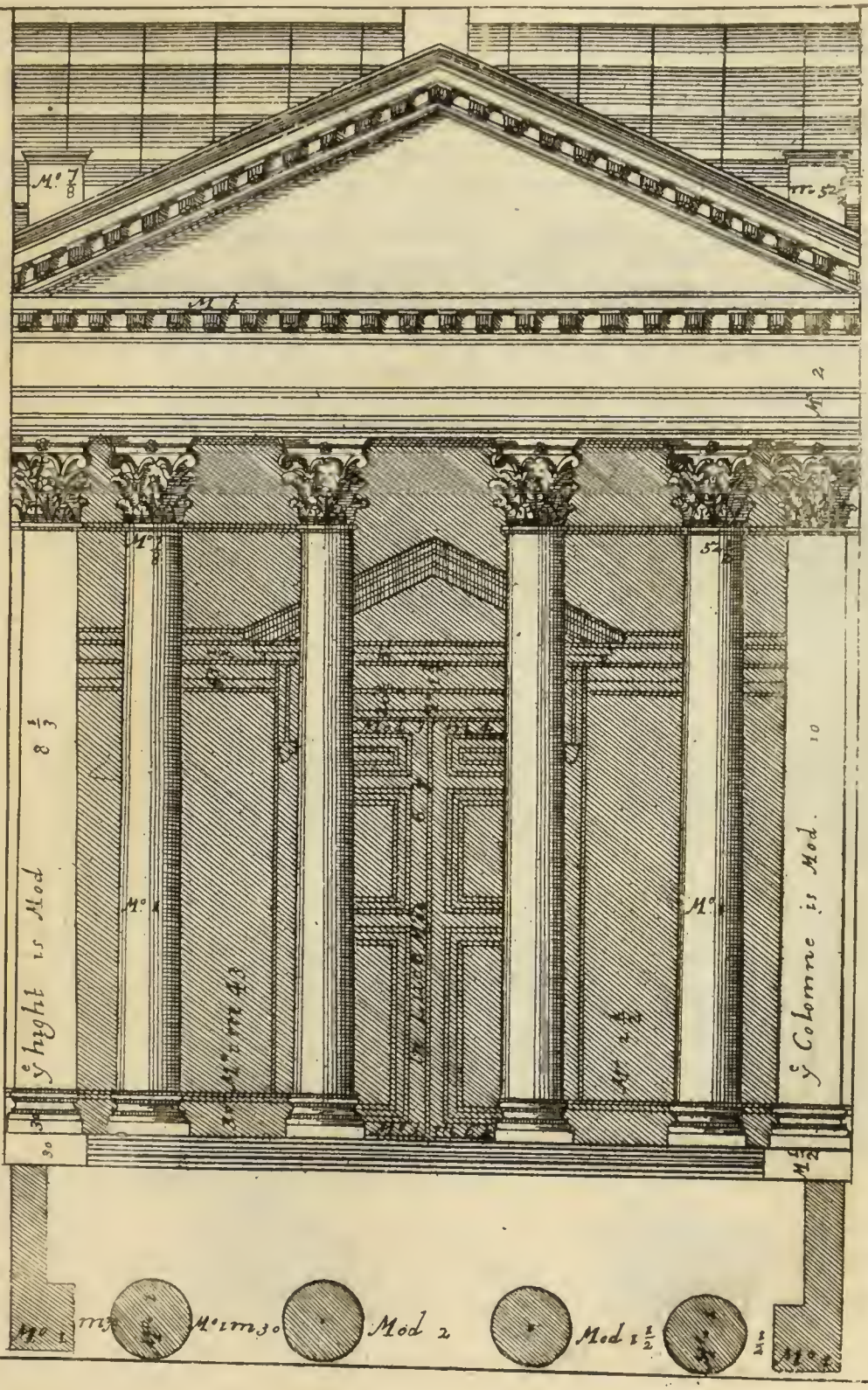


Impostsand Ornament of y.e ROMAN





The CORINTHIAN Colomne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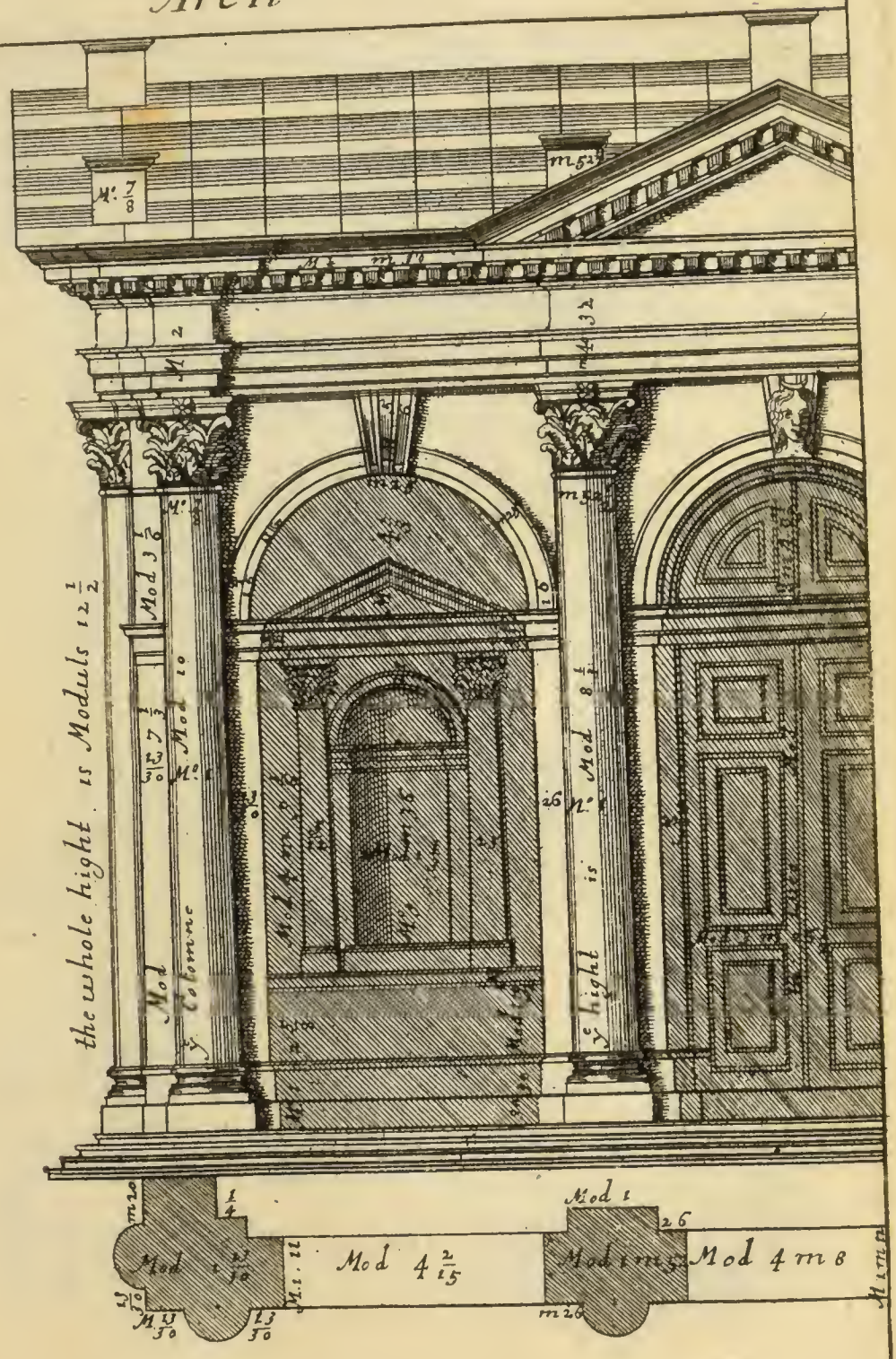
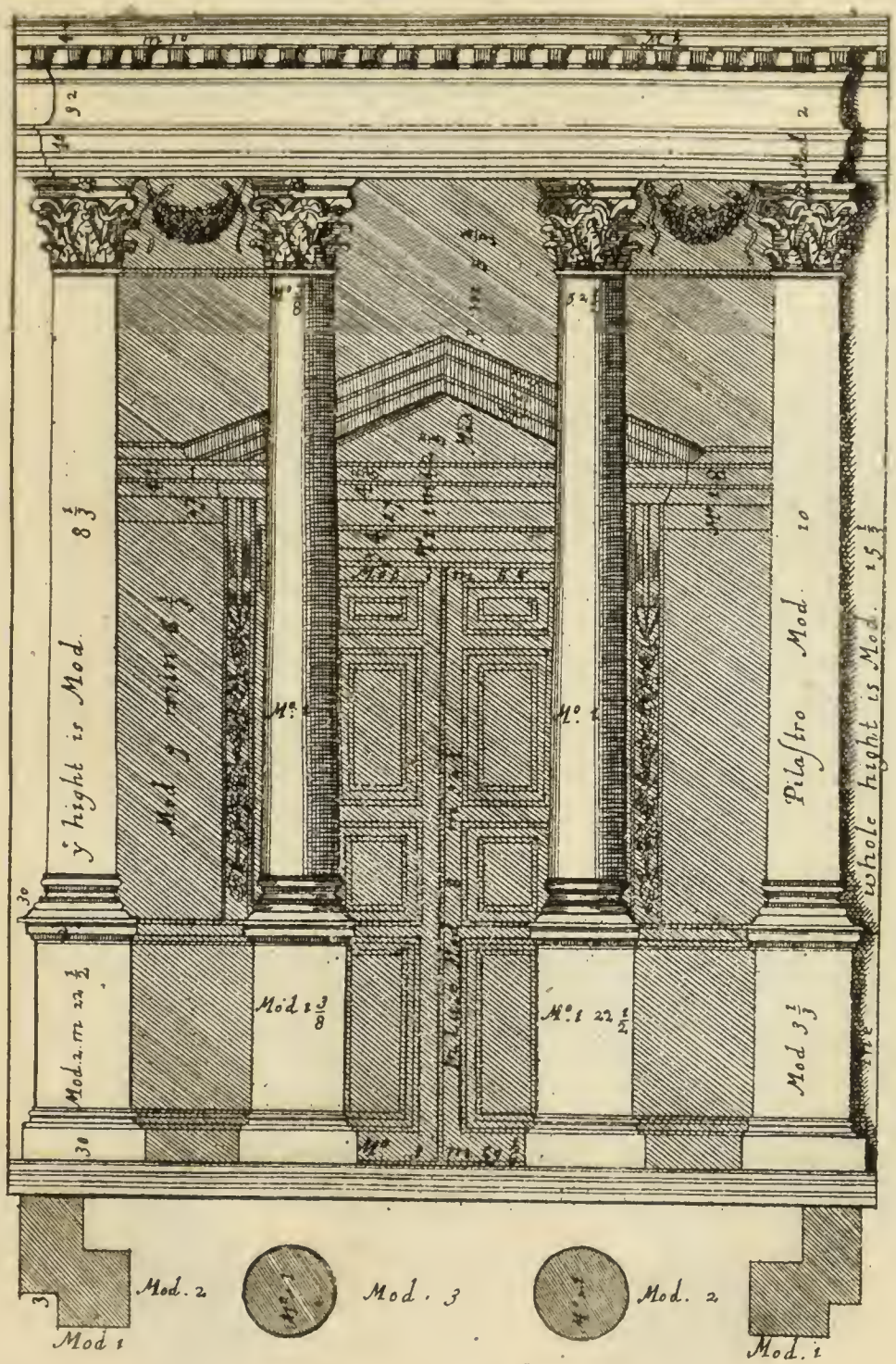
M° 1
M° 1

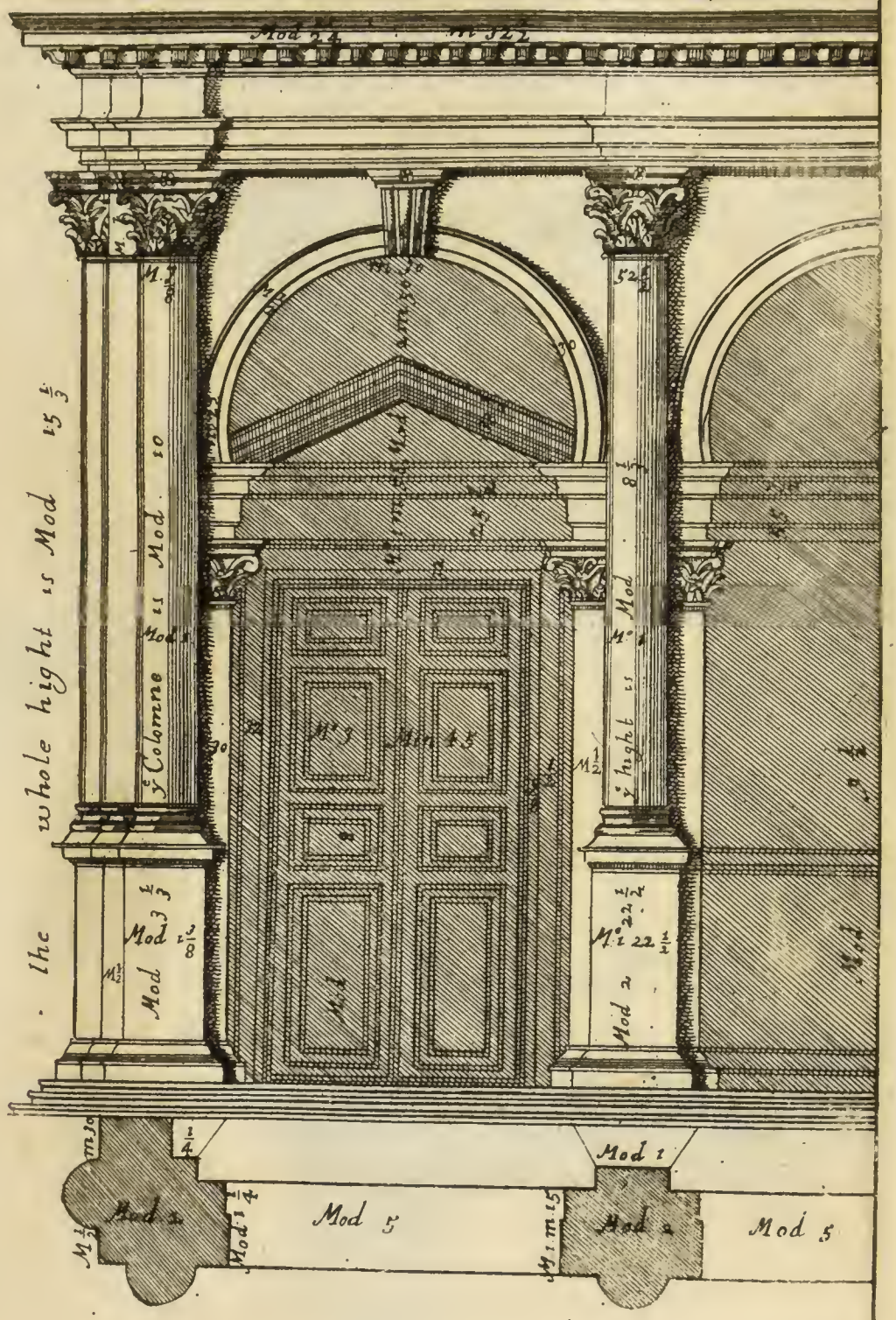
The CORINTHIAN Arch



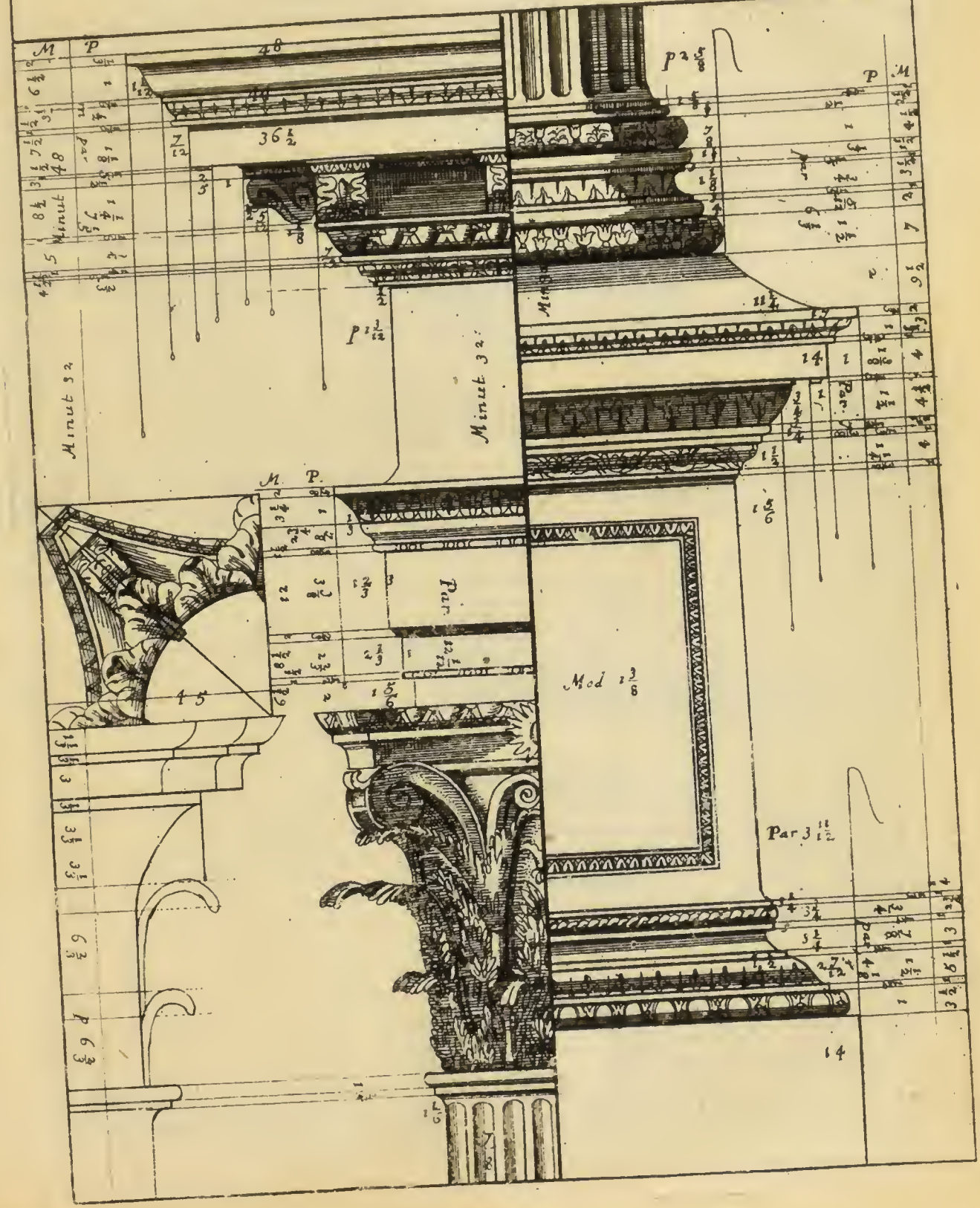
The CORINTHIAN Colomne W.th the Pedestall

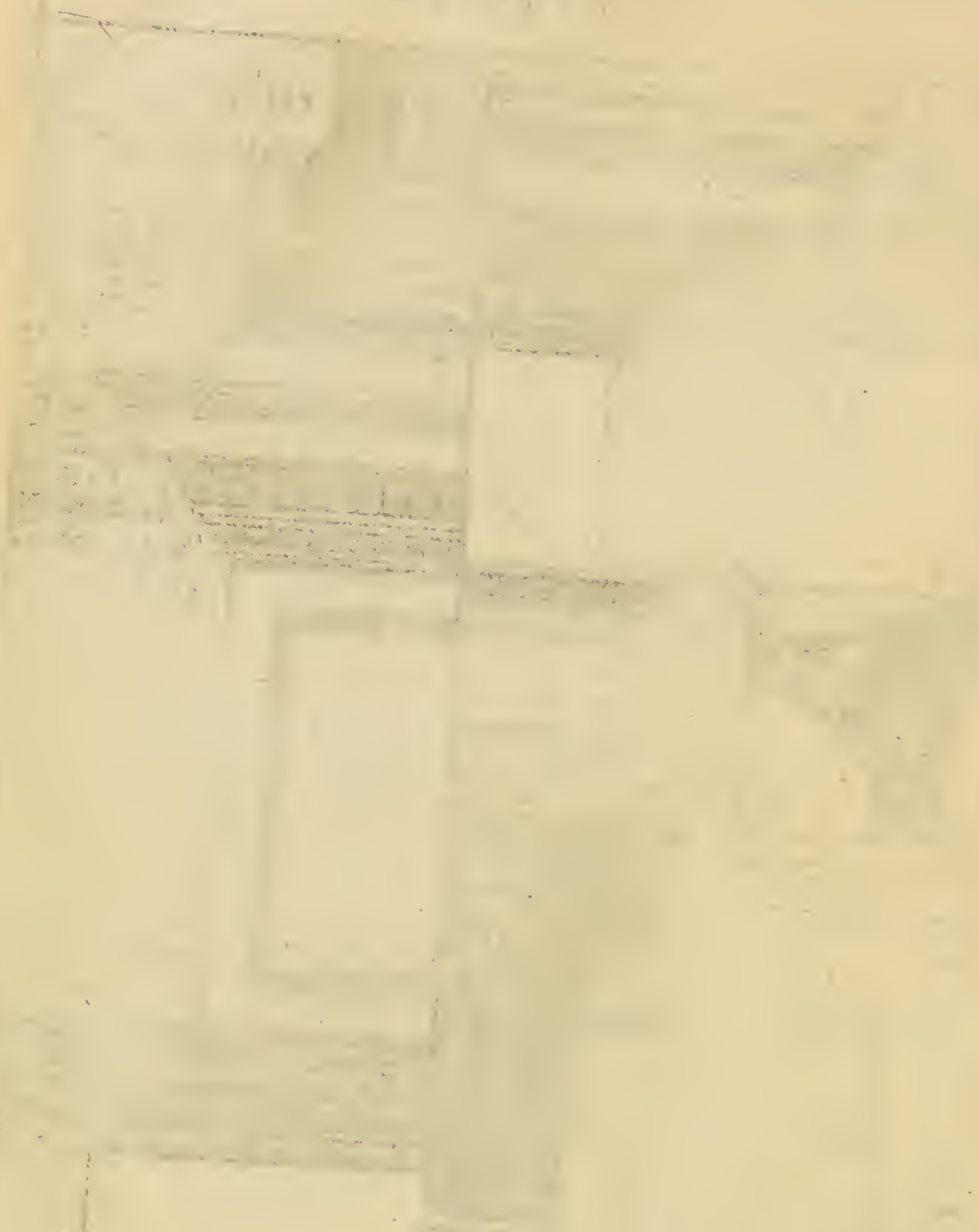


The CORINTHIAN Arch with Pedestall

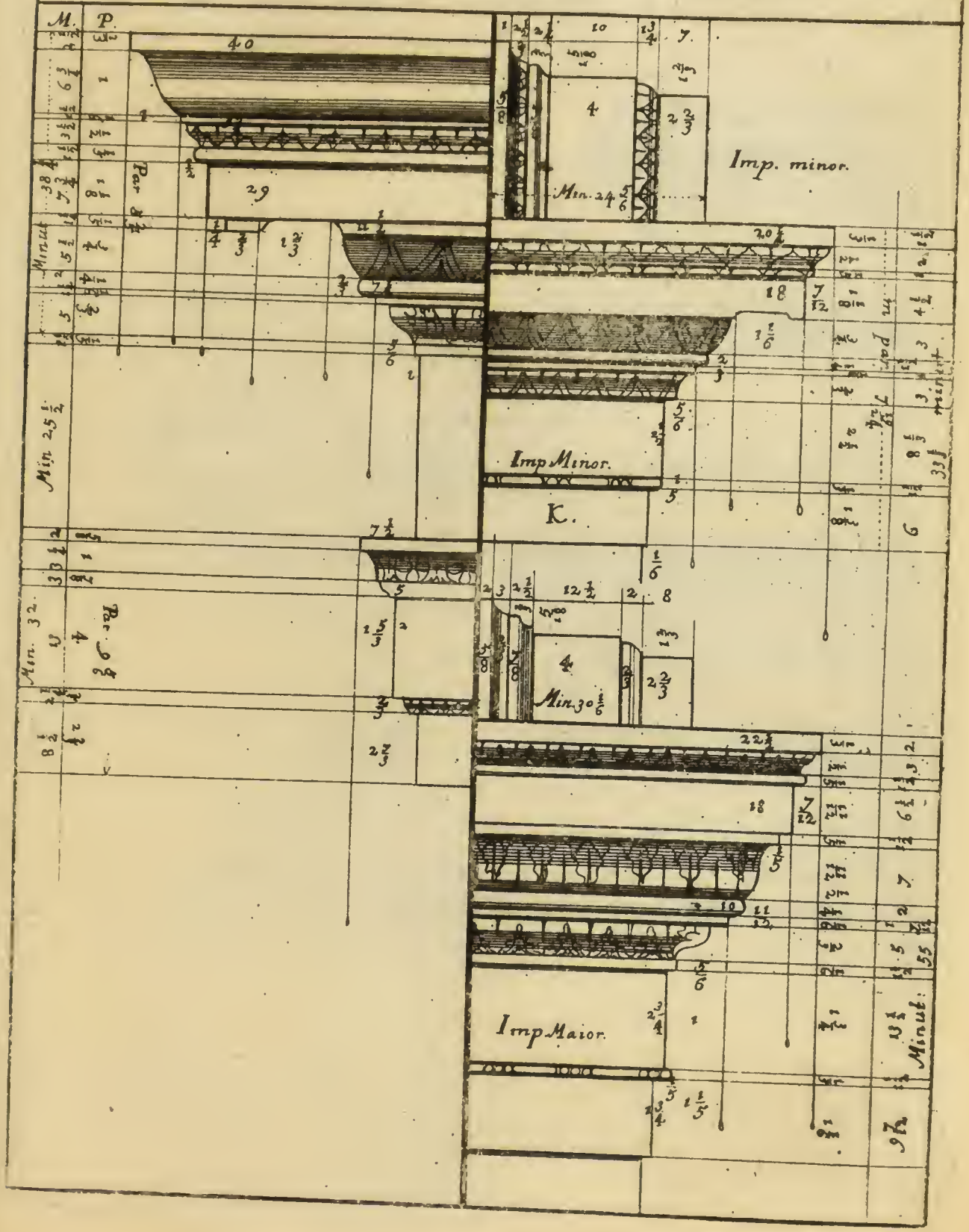


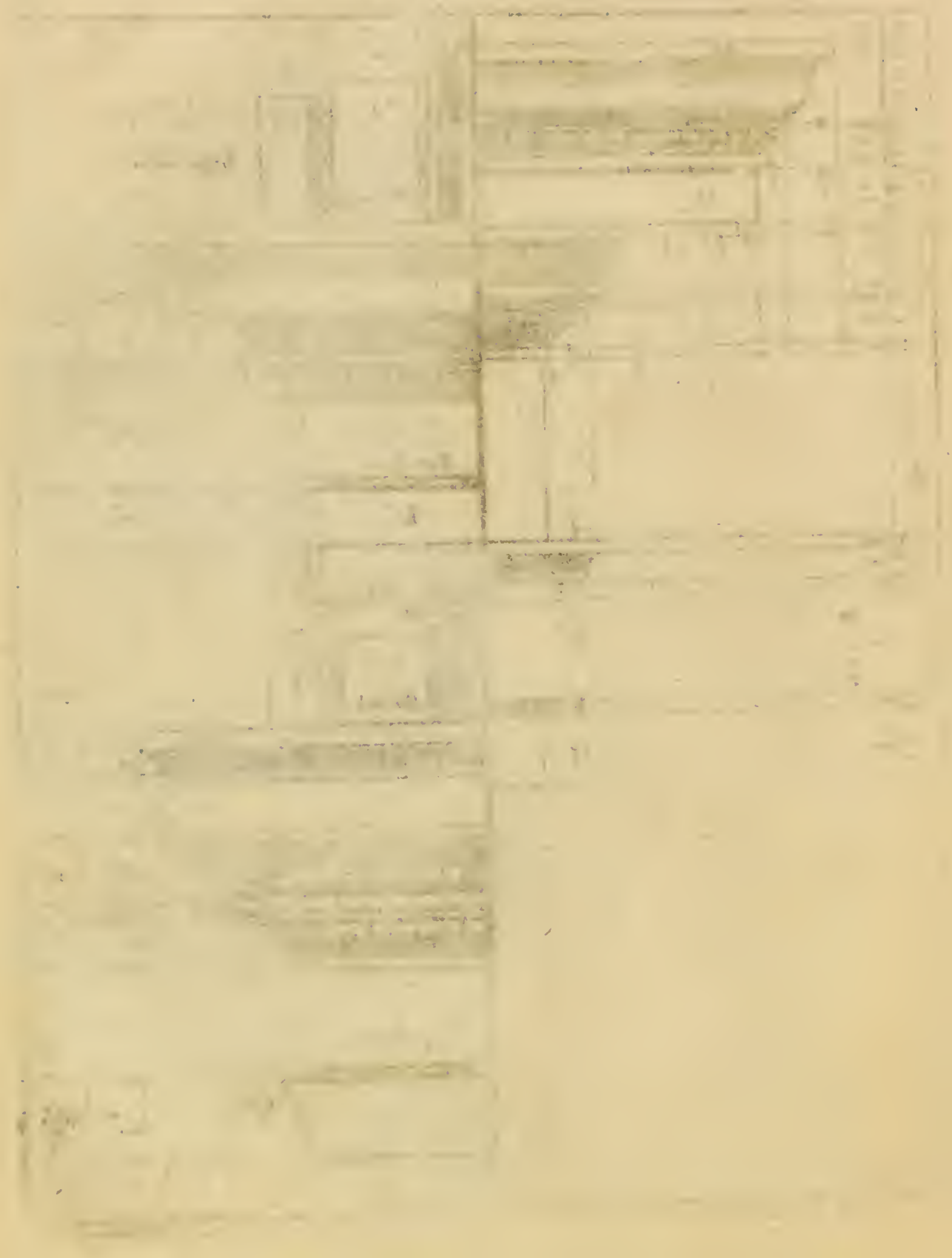
Pedestall Base and Ornament of y^e 30
CORINTHIAN



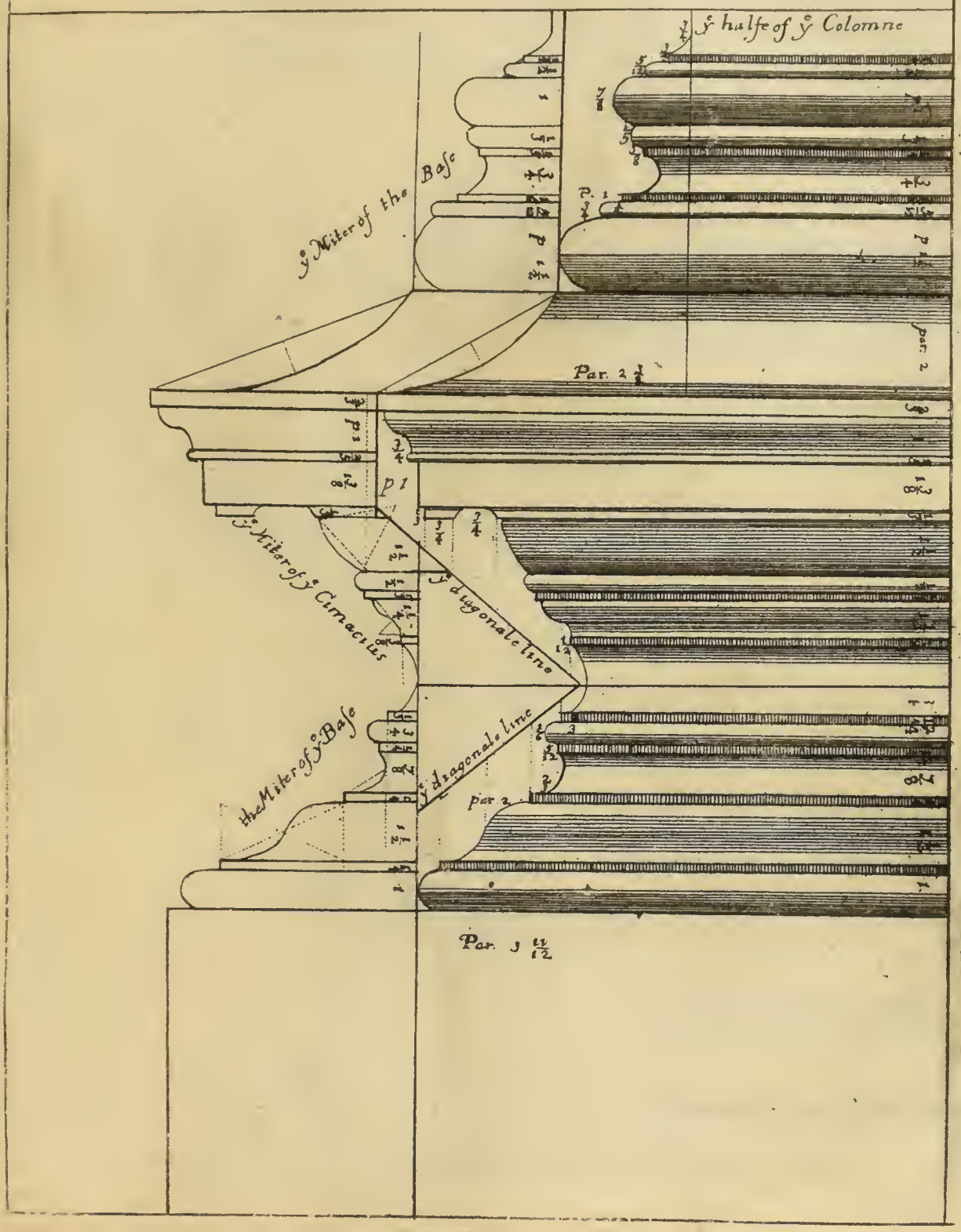


Imposts and Ornament of ye CORINTHIAN

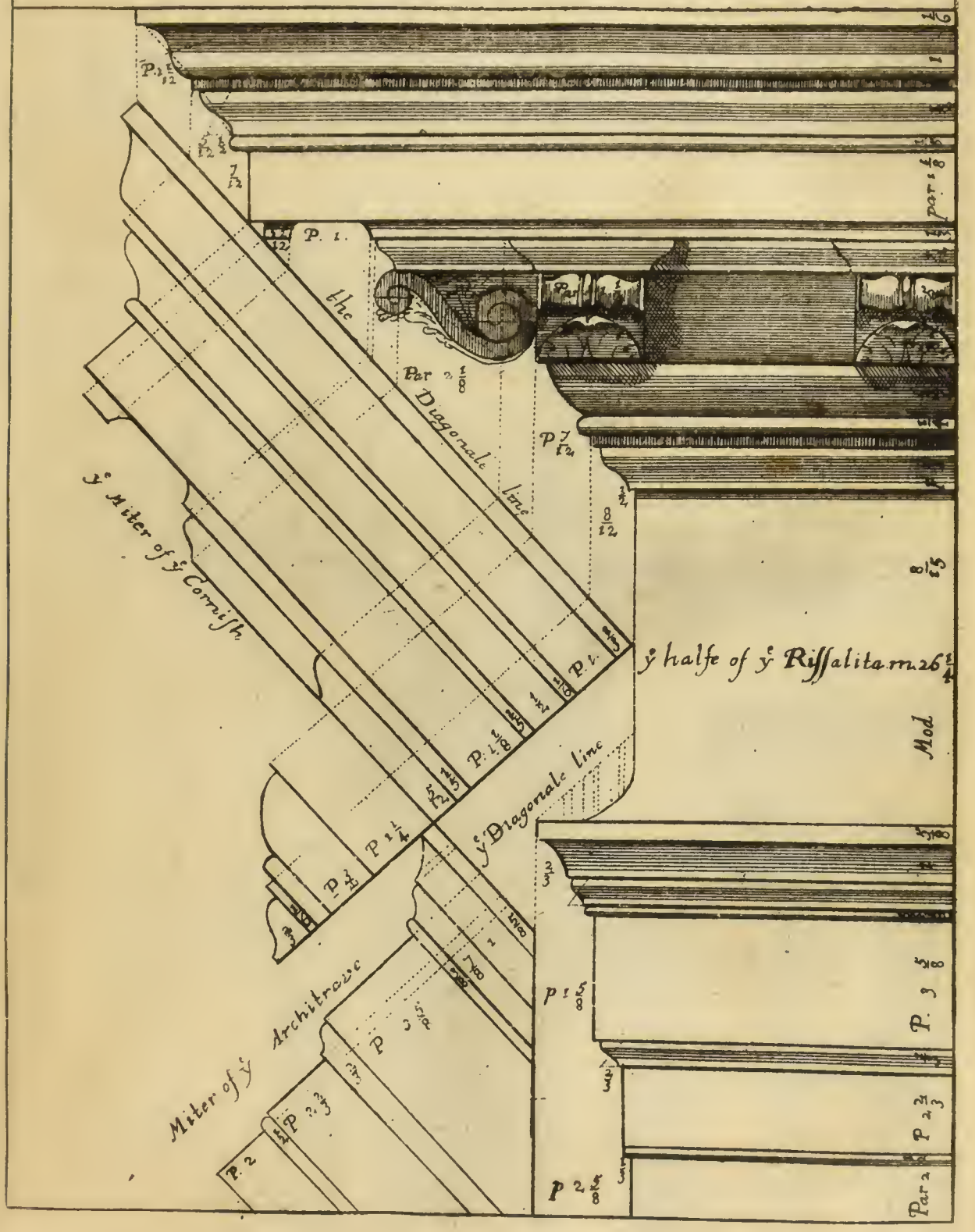




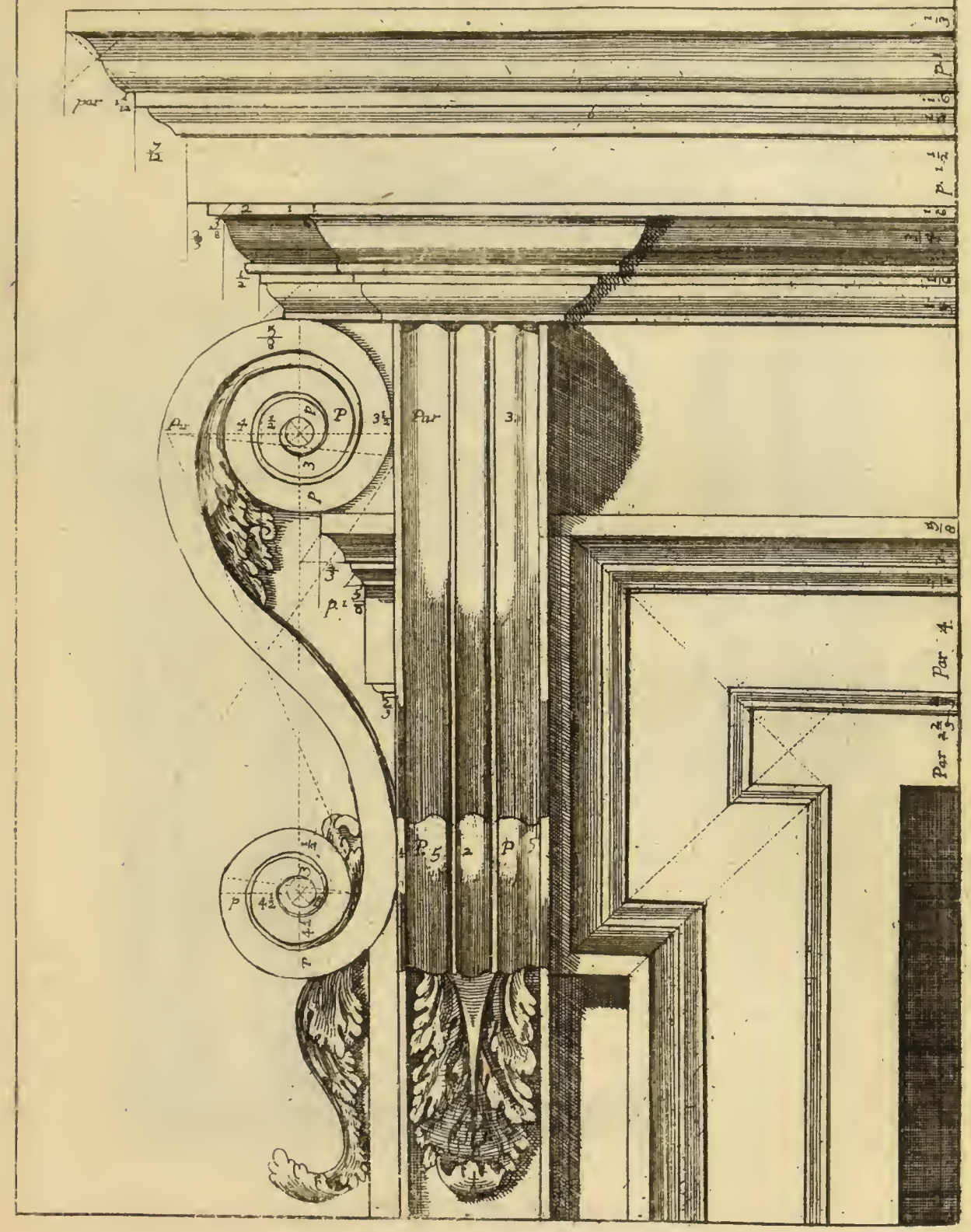
The Base of the CORINTHIAN order

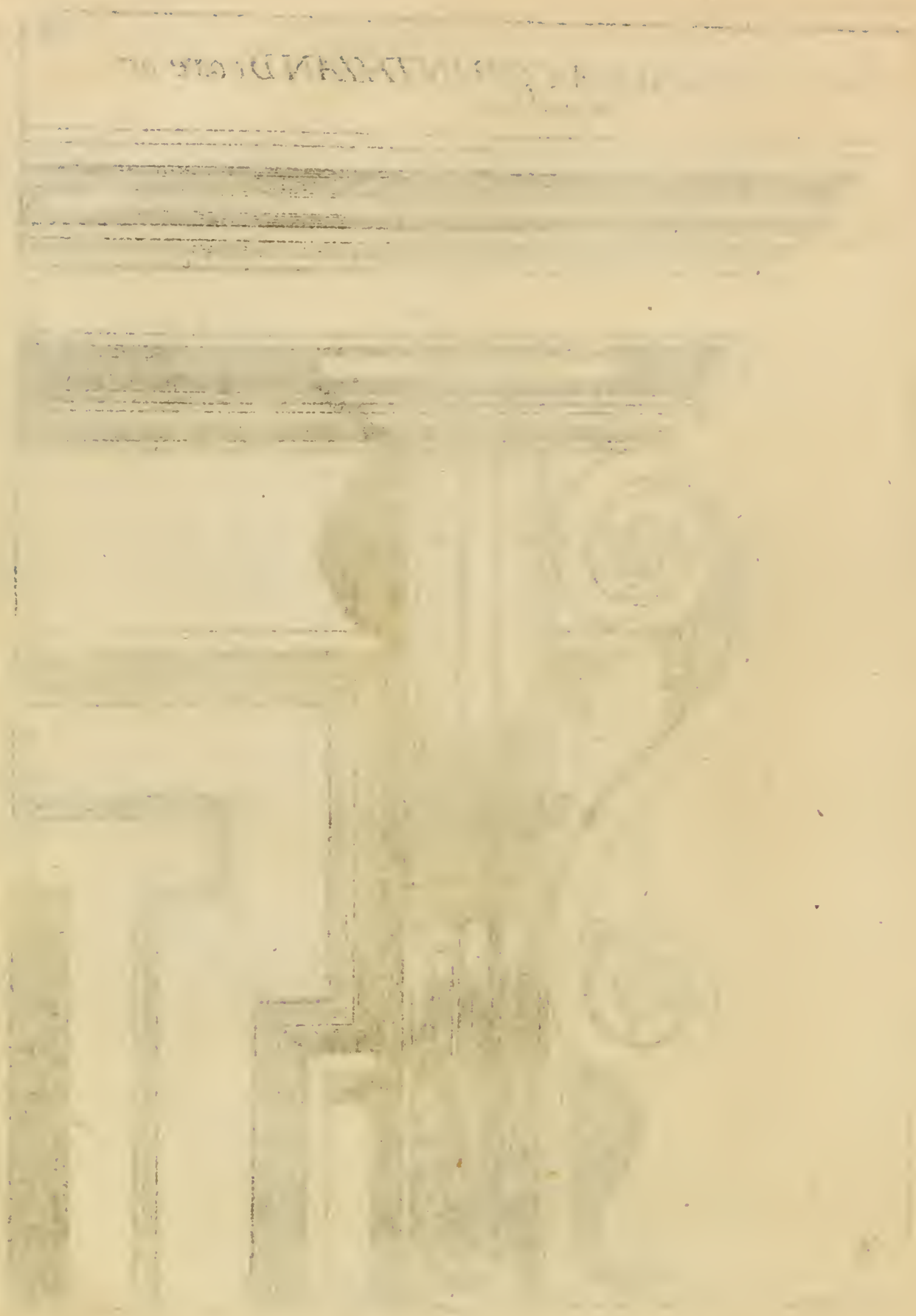


The CORINTHIAN Ornament.



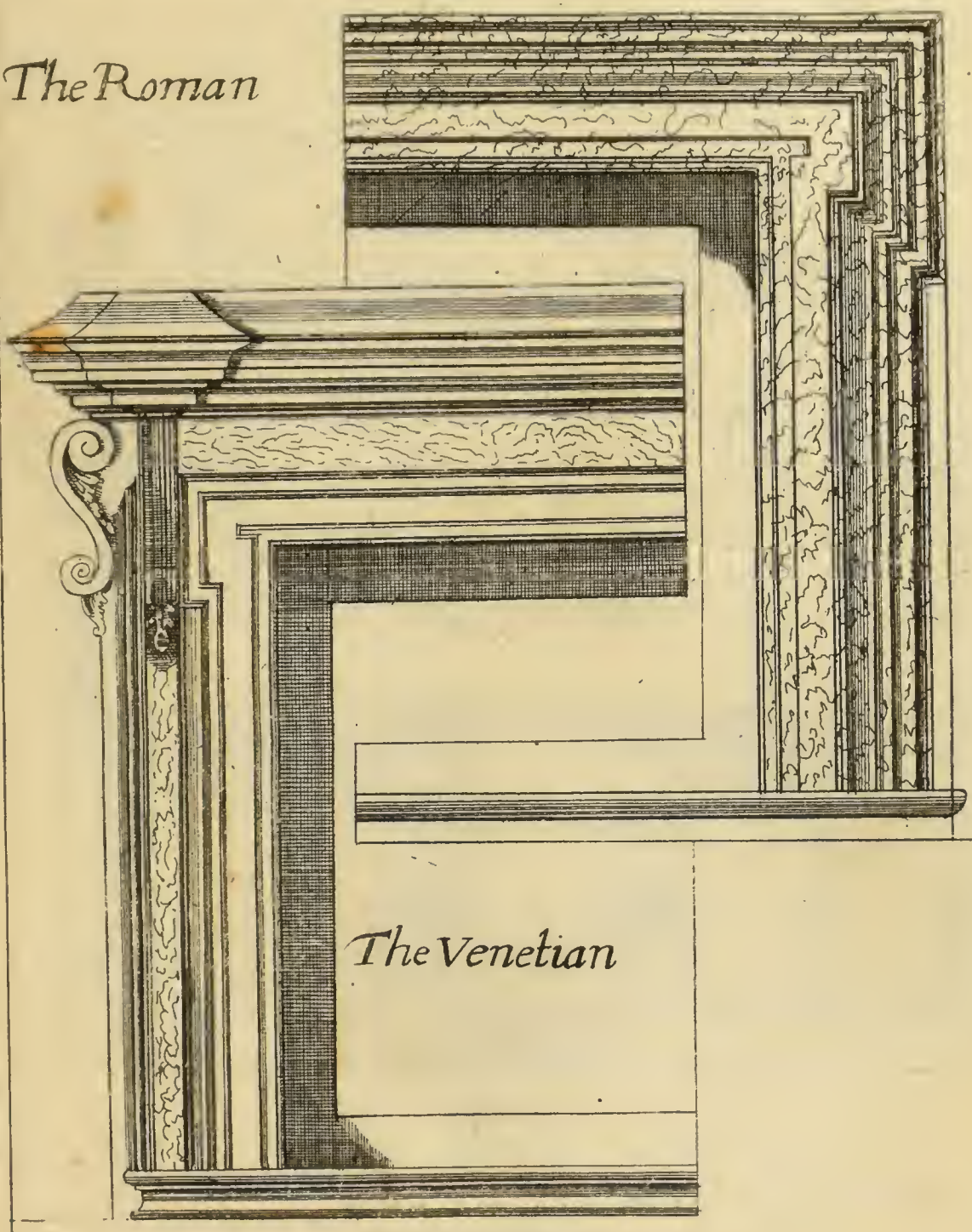
The Ornament of A CORINTHIAN Doare or window





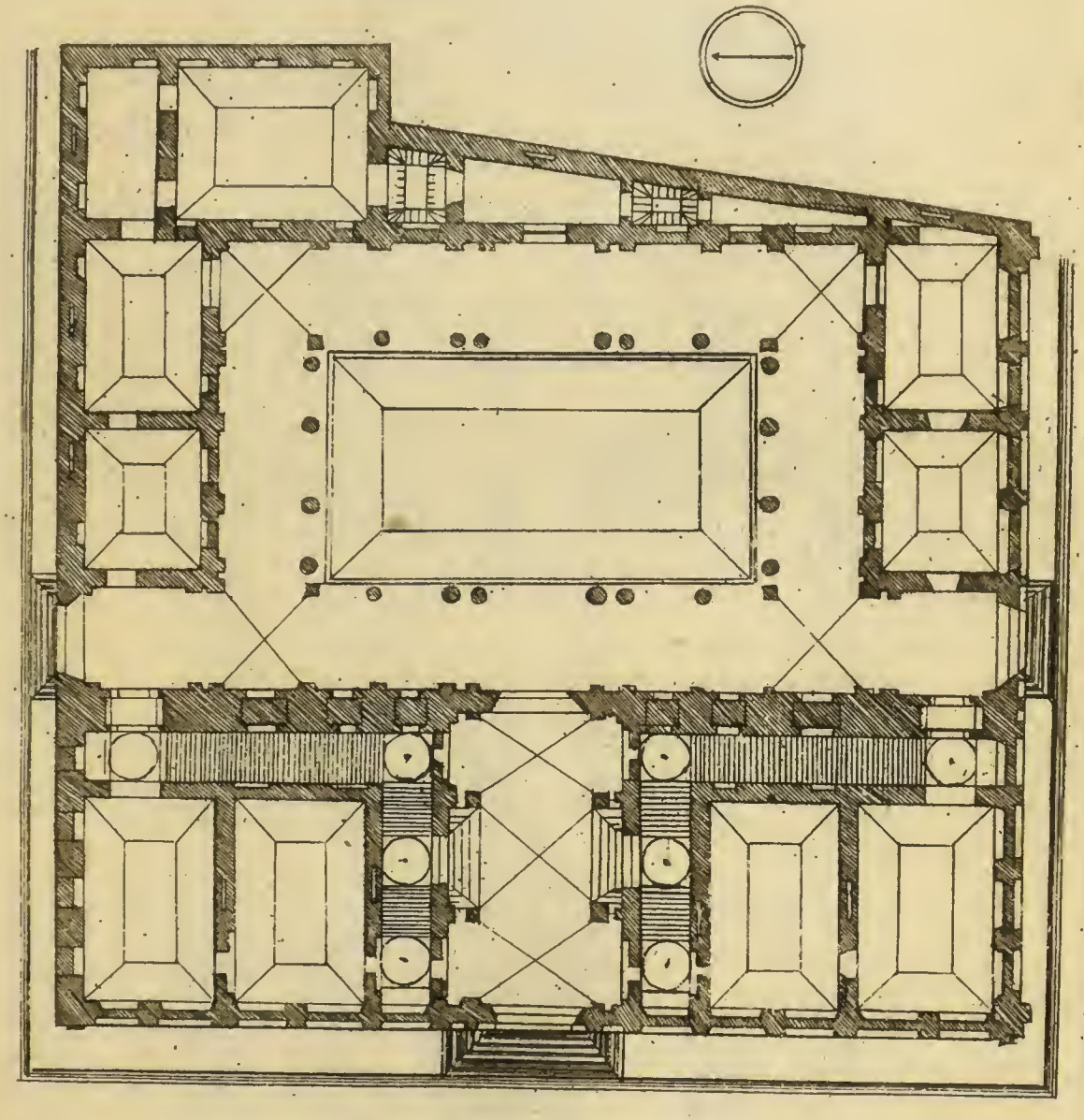
Two Mantle trees for a Chimney:

The Roman



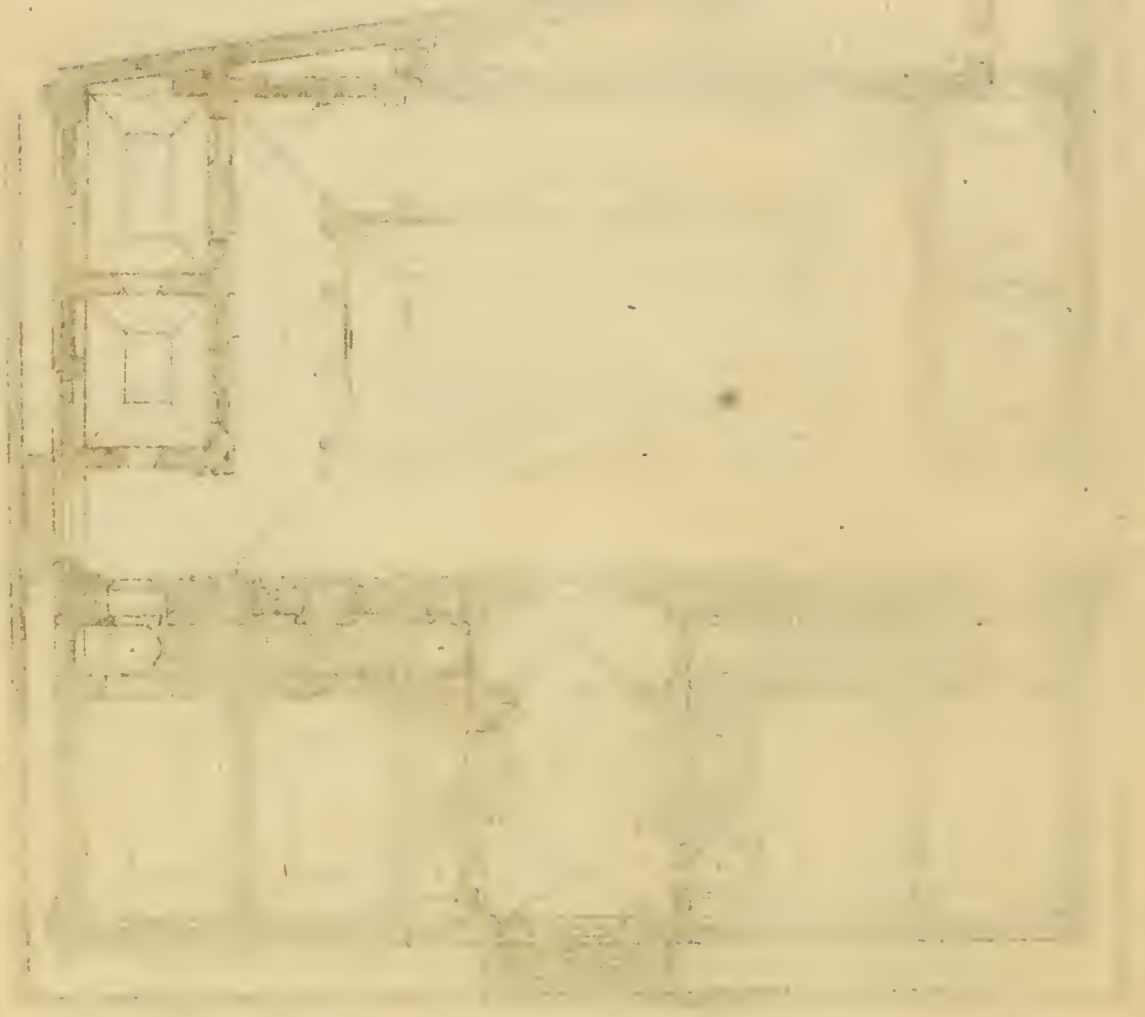
The Venetian

ye Ground platt of my Lord Strozzi house Standing att Florence

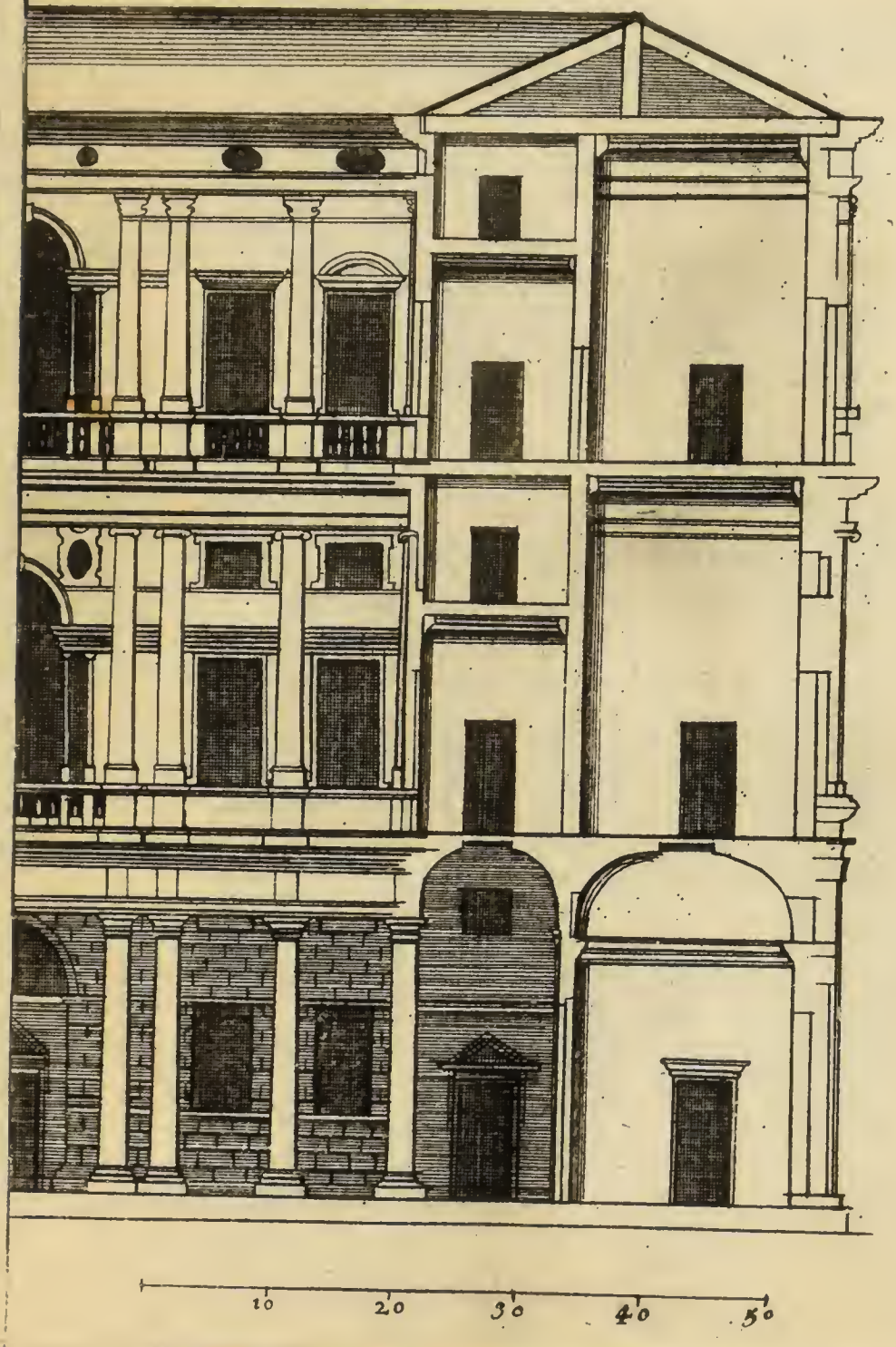


Feete.

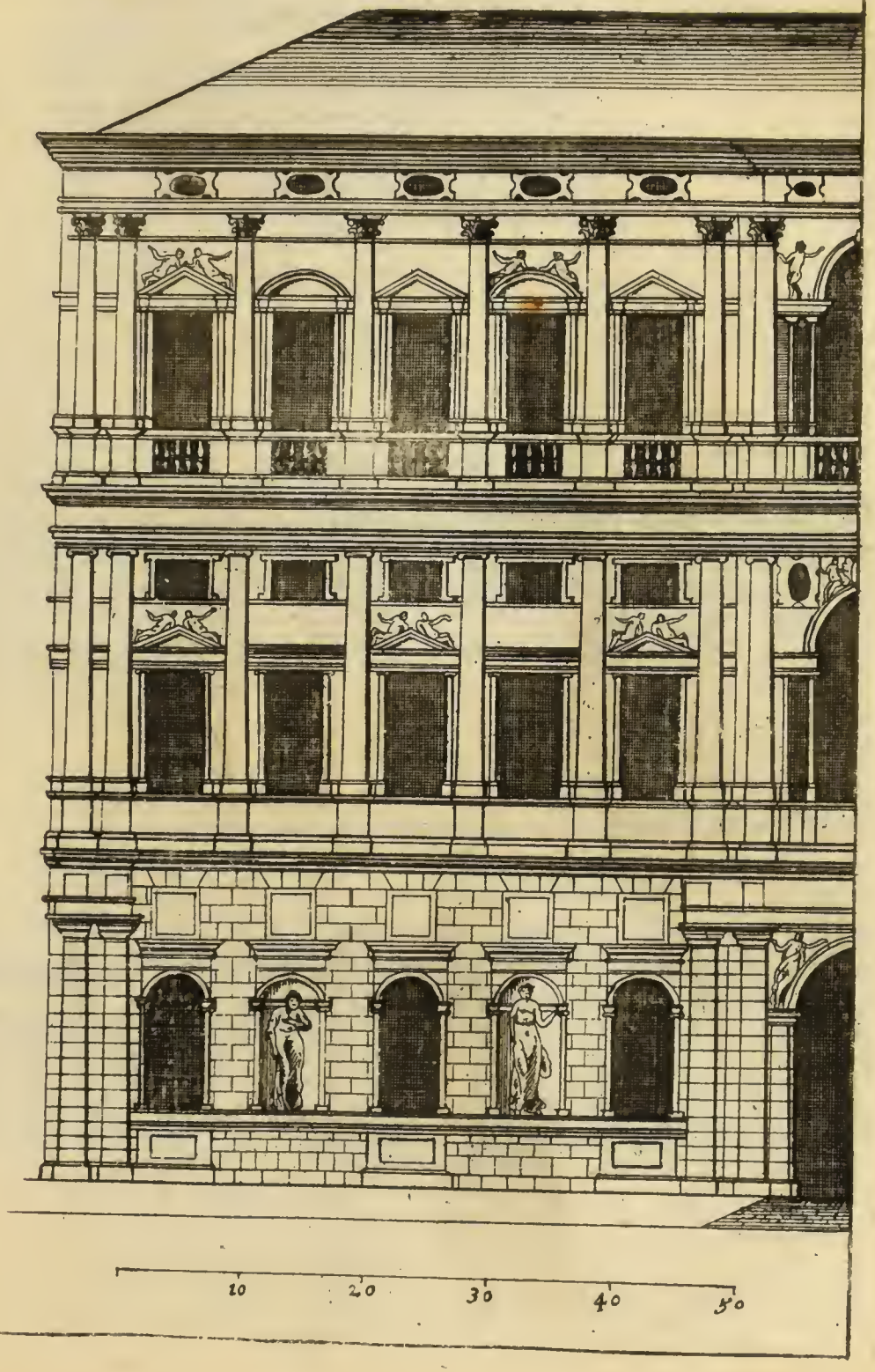
10 20 30 40 50 60 70 80 90 100



The Inside of my Lord Strozzi house standing att Florence



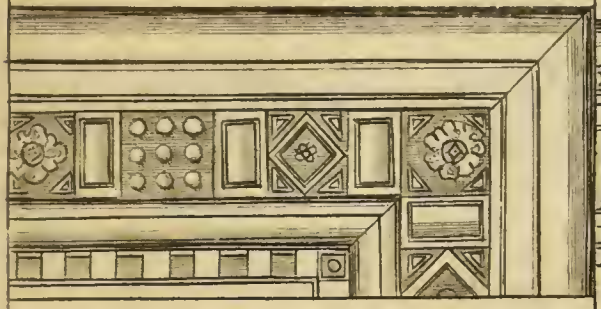
The front of my Lord Strozzi houſe standing att Florence



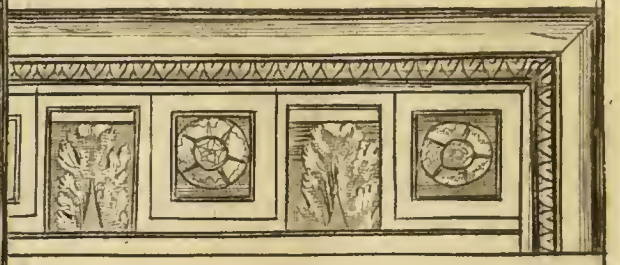
The Vnderside of ye Cornish

Toscana

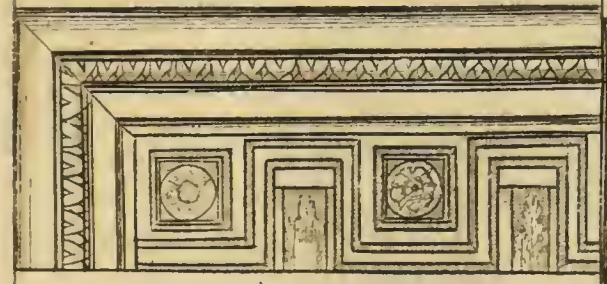
Dorica



Ionica



Romana



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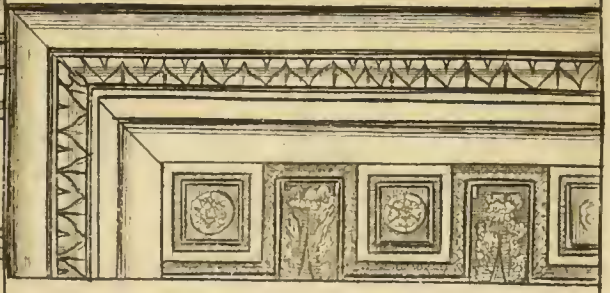

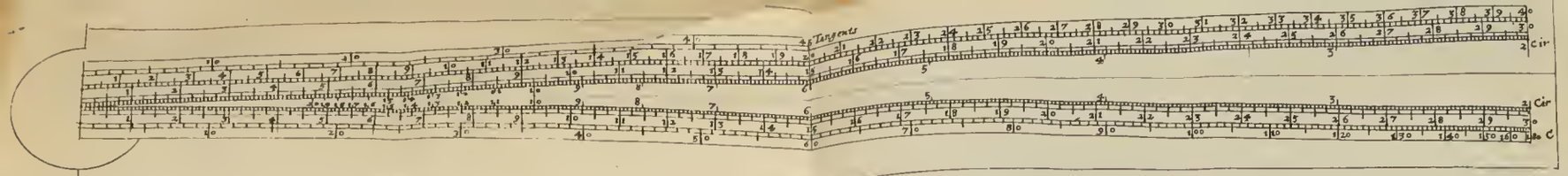
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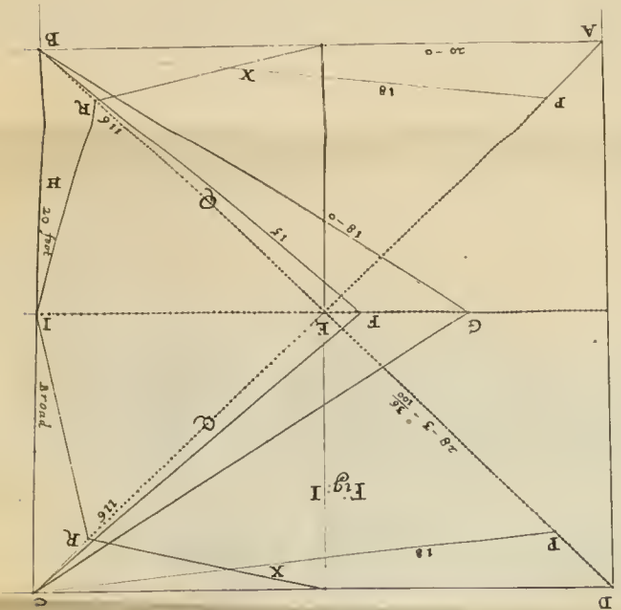
Fig. I
20 - 0
18
38 - 3 3/4
broad
20 feet
11 6
11 6
18
15
0 - 8 1/2

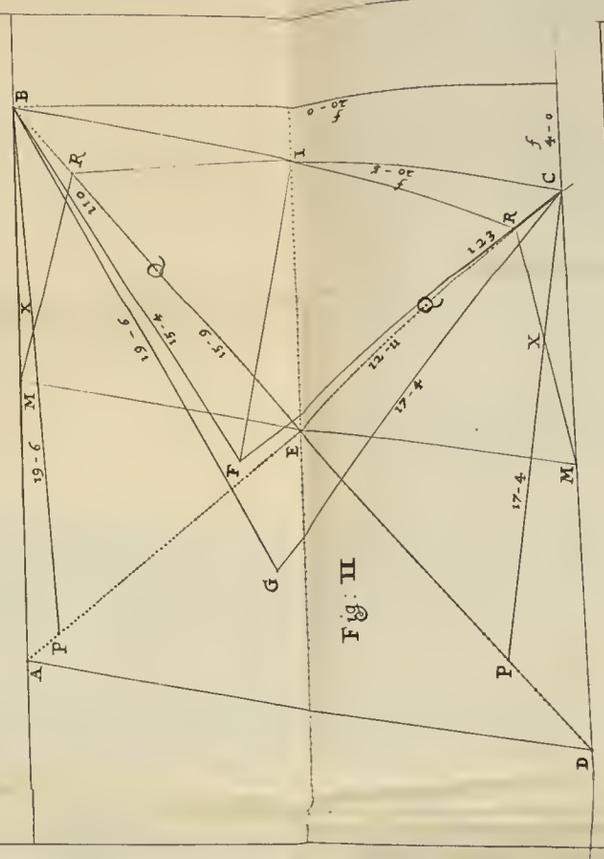
Fig. II
20 - 0
8 - 0
4 - 0
11 0
12 3
15 - 4
6 - 5
19 - 6
12 - 11
17 - 4
17 - 4

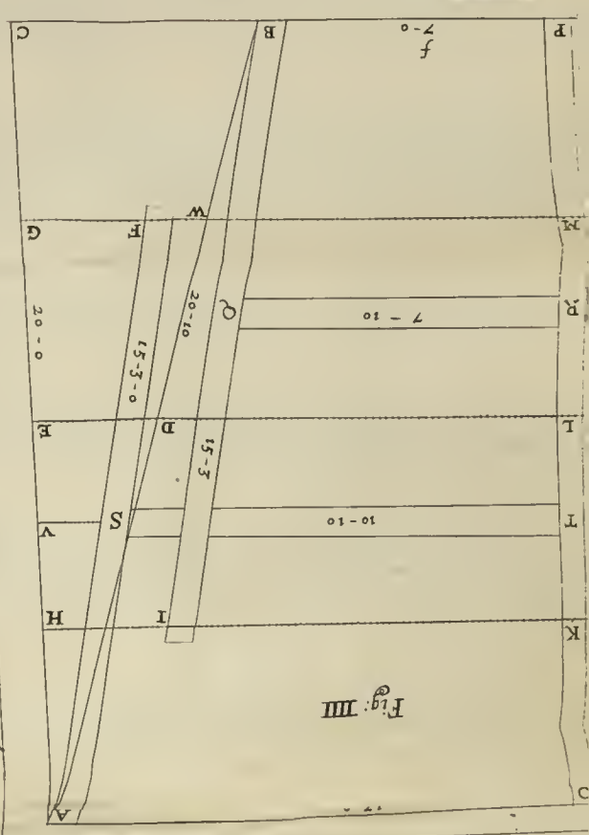
Fig. IIII
7 - 0
7 - 10
20 - 0
15 - 3 - 0
20 - 10
15 - 3
10 - 10

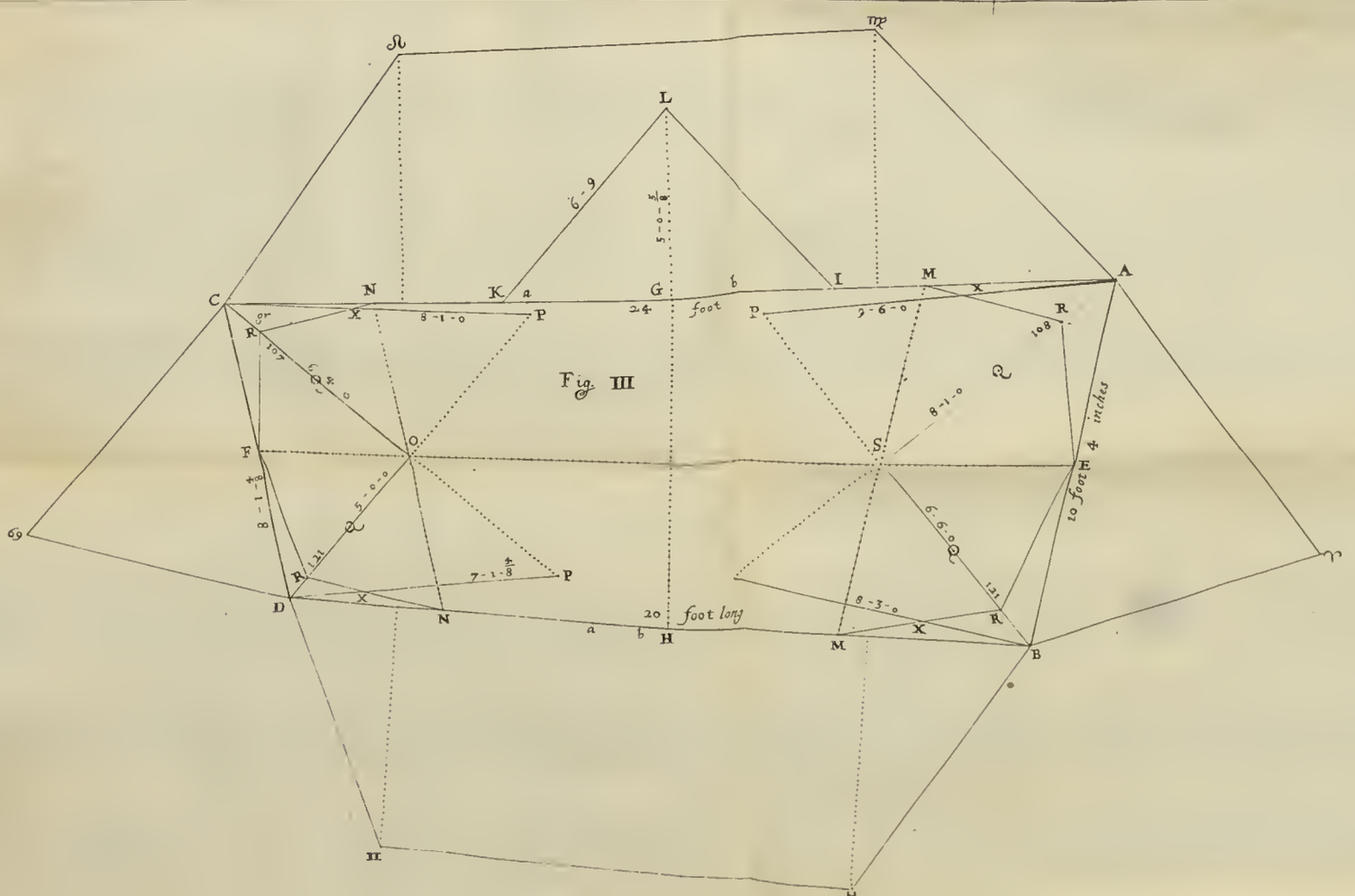
Fig. III
6 - 9
5 - 0 - 5/8
24 foot
8 - 1 - 0
2 - 6 - 0
8 - 1 - 0
5 - 0 - 0
7 - 1 - 4/8
8 - 3 - 0
6 - 6 - 0
20 foot long
10 foot 4 inches

The Deſcription and Uſe of a Joint-Rule fitted with Lines for the ready finding the Lengths and Angles of Rafters, Hips and Collar-Beams in any Square or Bevelling Roofs at any Pitch.

FIrſt, The Rule is an ordinary Jointed Rule of a Foot long when ſhut together, or two Foot being opened to a ſtraight Line. And the Lines delineated thereon for this purpoſe, are

1. Firſt, a Line of Lines, drawn Sector-wiſe from a Center on both Legs of the Rule, but continued to 30 at the end in ſtead of 10 the old uſual manner, and every ſingle Integer of the 30 is divided into 12 parts, to repreſent every particular Inch of the 30 Foot according to the common reckoning by Feet and Inches.

2. There is another Scale of Equal parts alſo, of the ſame length lying as near to the other of 30 as may be, on one Leg only, which is divided into 40 parts, to repreſent 40 Feet: and each of thoſe 40 Feet, parted into 6 parts to repreſent every two Inches only, becauſe the room for one Foot, will not admit of more parts.

3. In the ſame place on the other Leg is divided a Line of natural Sines and Tangents to 45, but numbred as a Line of Chords to 180 Degrees, to ſet the Rule to, or to find the quantity of any Angle, in the proper terms of expreſſion (all the world over) degrees and minutes.

4. On the innermoſt Line of the 30 Scale that runs to the Center is ſet 20 pricks, beginning at 2 at the Center-pin at 30, and ſo proceeding with 3, 4, 5, and 6 at the Center-pin at 15, and then 7, 8, 9, 10, and ſo forwards to 20, towards

the Center; which serves to divide a Circle into any number of parts, very useful and ready in the practice of Drawing or Architecture.

Thus much for Description; the Uses follow.

The Uses of this Line of Lines, or Scale of equal parts to 30, drawn from the Center, is of a general and manifold use: as Mr. *Gunter* in his Book of the *Sector* hath shewed.

A brief touch whereof take in the first place, as by the way, and then the use of the Rule to the business intended.

And for the better doing hereof, it is needful to explain three or four terms, for the avoiding of many words, and needless repetitions in this brief, yet plain Discourse.

1. First, by the word Lateral is meant any distance taken, either in Feet and Inches, on the 30 Scale; or degrees and minutes on the Chords, taken and counted from the Center, in the midst of the head of the Joint-Rule along any one Leg: as thus; Suppose I would take out 15 Foot Laterally, set one point of the Compasses in the Center at the head, and open the other to 15 on any one Leg on the 30 Scale; this extent I call a Lateral Extent of 15 Foot. Also if you take the Lateral Chord of 60 Degrees, you shall find the extent of the Compasses from the Center to 60 to be the same as from the Center to 15 Foot, on the 30 Scale of Feet and Inches.

2. By the word Parallel, I mean any distance taken, by setting one point of the Compasses in any number of Feet and Inches on one Leg, and the other point in the same, or any other number on the other Leg, across from one Leg to the other; as thus the Rule being opened, then the extent of the Compasses from 20 on one Leg, to 20 on the other Leg, is a Parallel extent.

3. In all Parallel Extents, you must set one point of the Compasses in the Common Line on one Leg, to the Common Line on the other Leg, which Common Line is that only of the 30 Scale which runs to the Center, in which the Center-pins at 15 and 30 are.

4. The nearest distance from a point to a Line is only thus; Set one point of the Compasses in the point given, and open or shut the other being turned about, till the other will but just touch or cleave the Line, that I call the nearest distance.

Uſe I.

To lay down a Line, that ſhall repreſent any Number of Feet and Inches given or required.

Take the Number given laterally from the 30, or 40 Scale from the Center, and that is the Line required.

But if theſe Scales are too great, or too ſmall, then take your Number of parts, and the length thereof Laterally.

As for Example; ſuppoſe I would have 3 Inches to repreſent 30 Foot, take out 3 Inches between your Compaſſes, and make it a parallel in 30 and 30, and the 30 Scale is ſet to your deſire.

Uſe II.

To increaſe or diminiſh a Line to any Proportion.

Take the given Line between your Compaſſes, and make it a parallel in the parts thereof; then the parallel extent of the parts you would have it increaſed, or diminiſhed to, is the Augmentation, or Diminution, which was required.

Example, Let 3 Inches repreſent 8 Foot, and to the ſame proportion I would have 10 Foot, or 5 Foot, *viz.* more or leſs.

Take 3 Inches between your Compaſſes, and make it a parallel in 8, and 8 on the 30 Scale; then the parallel diſtance between 5 and 5, doth diminiſh the Line, and the parallel between 10 and 10 doth Increaſe the Line to the proportion required.

Uſe III.

To divide a Line into any Number of parts or models under 30.

Take the given Line, and make it a parallel in the parts on the 30 Scale into which you would have it divided, then the parallel extent between 1 and 1 ſhall divide the Line accordingly.

Example, Let 4 Inches be a Line to be divided into 9 parts, take 4 Inches, (or any diſtance whatſoever) and make it a parallel

rallel in 9 and 9 on the 30 Scale; then the parallel diſtance between 1 and 1 ſhall divide 4 Inches into 9 parts required: Note, that for more exactneſs and conveniency, you may Double 9, or Triple 9, *viz.* 18, or 27, and then if you make the Line to be divided, a parallel in Triple the Number you muſt take out 3 in ſtead of one, and that ſhall divide the Line into the parts required.

Example, I would have 5 Inches put into 10 parts, take 5 Inches between your Compaſſes, and make it a parrallel in 30, and 30 the Triple of 10, then take out parallel 3, and 3 the Triple of one: and that ſhall divide the Line given being 5 Inches into 10 parts or models exactly: the like for any other. And note, as the Rule ſtands you may take out any number of parts or models whatſoever, to that Scale.

Uſe IV.

Any two Lines given, to find their Proportion one to another according to any other Number.

Take the Lines ſeverally, and lay them Laterally from the Center, on the 30 or the 40 Scale, which you pleaſe; and the Numbers of Feet and Inches, to which they reach, ſhall ſhew their proportion one to another of the parts of the Line on which they are meaſured.

Example, I have 2 Lines, ſuppoſe one is 2 Inches long, and the other 5, or any other unknown part.

Take 2 Inches the meaſure of one Line, and meaſure it Laterally on the 30 Scale, and it gives 5 Foot $\frac{1}{2}$ an Inch, then take out 5 Inches the ſuppoſed length of the other Line, and it gives Laterally 12 Foot 8 Inches; then I ſay one Line is 5 Foot and half an Inch, and the other is 12 Foot 8 Inches of a Scale of 30 Foot in 11 Inches 3 quarters length.

Or if you conclude on the Term or number of one Line, then make that Line a parallel in the parts thereof, then take the other Line, and carry it parallelly till it ſtay in like parts, on both Legs in the common Line, and that ſhall be the Denomination of the other Line.

Uſe V.

Two Lines being given, to find a Third in continual Proportion to them.

Take both the Lines, and lay them laterally on both Legs,and note the Feet and Inches to which they do extend as in the laſt.

Then take out the lateral extent of the ſecond Line, and make a parallel in the terms of the firſt Line, keeping the common Line at that opening, then the parallel extent from the terms of the ſecond Line, ſhall be the lateral 3d Term or Line in Proportion.

Example, Suppoſe I have one Line 3 Foot long, and another 5 Foot,and I would have another to bear proportion to 5,as 3 doth to 5 increaſing, being in numbers thus; as 3 is to 5, ſo is 5 to what? Here note that 3 is the firſt number, and 5 the ſecond.

The firſt Line laid from the Center, on the 30 Scale, extends to 7 Foot 7 Inches, and 5 Inches; the ſecond Line gives 12 Foot 8 Inches.

Now the lateral ſecond Line,*viz.* 5, or 12 Foot 8 Inches,made a parallel 7 in Foot 7 Inches, the terms of the firſt Line, then take out the parallel extent from 12 Foot 8 Inches (the meaſure of 5) and it ſhall give 21 Foot 1 Inch laid laterally from the Center, for a third Proportional required; which, meaſured on the Inches, is 8 Inches and a third, the anſwer required; for as 3 is in proportion to 5, ſo is 5 to 8, and a third part.

But by the Line of Numbers, having the quantity of the Lines given in Numbers, do thus:

The extent of the Compaſſes from the firſt Number 3, to the ſecond Number 5, ſhall reach the ſame way from the ſecond Number 5,to 8. 33 the third proportional Number required.

Uſe VI.

To divide a Line in ſuch ſort as another Line is divided.

Take the whole Line that is divided, and lay it laterally on both Legs, and fit the Line that is to be divided parallelly in the ends thereof, then lay every part of the divided Line laterally

rally in like manner, as the whole Line was laid, and the parallel extent between thoſe parts ſhall divide the Line accordingly: as for Example;

Suppoſe I would divide a Line of 8 Inches $\frac{1}{4}$ long in ſuch ſort as the Line of Circles on the inſide of the 30 Scale is divided.

Take out 8 Inches $\frac{3}{4}$, and make it a parallel in 2 and 2, the divided Line, then take out the parallel diſtance from 3 and 3, and that ſhall give the point 3 from the end of the Line you would divide, and ſo conſequently all the reſt in order, as far as you pleaſe.

Uſe VII.

To find a mean Proportional between two Lines or Numbers.

Open the 30 Scale to a right Angle, by making lateral 21 Foot 2 Inches a parallel in 15 Foot.

Then find the Sum and half Sum, the Difference and half Difference, between your two Numbers; and having the half Sum between your Compaſſes, ſet one Point to the half Difference counted laterally on one Leg; and whereſoever the other Point ſhall touch the common Line on the other Leg, is the mean Proportional required.

Example, Suppoſe a piece of Timber be 10 Inches one way, and 18 inches another, what is the Square equal, which is the mean Proportional between them? the ſum of 10 and 18 is 28, the half ſum is 14; the Difference between 10 and 18 is 8, the half Difference is 4. Now the 30 Scale ſtanding Square, taking 14 the half Sum between your Compaſſes, and then ſet one Point in 4 on one Leg, and turn the other Point of the Compaſſes toward the common Line, and there it ſhall ſhew 13 $\frac{1}{2}$ near the Square equal required.

Uſe VIII.

To work the Rule of Three by the Line of Lines to 30 or to 3 Numbers given to find a fourth, in Geometrical Proportion Direct.

Make the lateral ſecond a parallel in the firſt, then the parallel third ſhall give the lateral fourth number required.

Example,

Example, If one Foot of Timber coſt 10 *d.* what ſhall 6 Foot coſt? *facit* 60 *d.*

Make Lateral 10 a Parallel in 10 counted as 1, then the Parallel extent between 6 and 6 ſhall reach to Lateral 60, the Anſwer required (in pence.)

Again, another Example:

If 50 Foot, or a Load of Timber coſt 44 *s.* what ſhall one Foot coſt?

Take the Lateral Extent from 22 the half of 44 *s.* and make it a Parallel in 25 the half of 50, then the Parallel diſtance between 2 and 2 counted as 4 Foot ſhall give the Lateral Number of 3 *s.* 6 *d.* the price of 4 Foot, whoſe fourth part is 10 *d.* $\frac{1}{2}$ the price of one Foot. Note this help is uſed, to avoid the nearneſs to the Center where the work is inconvenient.

Uſe IX.

To meaſure flat Meaſure by the Scale of 30.

At any Inches broad to find how much in length makes a Foot.

Take Lateral 12, make it a Parallel in the breadth given, then take out Parallel 12 again, and it ſhall give the length of a Foot required.

Example, At 9 Inches broad, as Lateral 12, to Parallel 9, ſo is Parallel 12, to Lateral 16, the length required.

Uſe X.

The breadth of a Board given in Inches, and the length in Feet, to find the Content in Feet and Inches required.

Take the Lateral Length in Feet, and make it a Parallel in 12, then the Lateral diſtance, between the Inches broad, ſhall give the Parallel Content.

Example, Of 15 Foot 3 Inches long, and 9 Inches broad.

Take Lateral 15 Foot 3 Inches, and make it a Parallel in 12, then take out Parallel 9 and 9, and it ſhall give Lateral 11 Foot and a half the Content.

Uſe XI.

To meaſure Timber by the Line of Lines to 30.

At any Inches Square to find how much makes a Foot of Timber.

If the Piece be not Square, then by the eighth Uſe make it Square: Then thus;

Take the Lateral Side of the Square in Inches, make it a Parallel in 12, then take out the Parallel Side of the Square, and it ſhall give a Lateral 4th Number.

Then take out Lateral 12, and make it a Parallel in the 4th Number, and then take out Parallel 12 again, and it ſhall ſhew the anſwer in Inches laid Laterally from the Center.

Example. At 9 Inches Square what makes a Foot?

As lat. 9. to par 12, ſo is par. 9. to lat. 6. $\frac{3}{4}$: Again,

As lat. 12 to par. 4th, *viz.* 6 $\frac{3}{4}$, ſo is par. 12, to 21 Inches $\frac{1}{2}$ the length to make one Foot required.

Uſe XII.

The Inches, Square, and Length given in Feet, to find the Content in Feet and Inches.

As the Lat. Side of the Square to Parallel 12, ſo is the par. lenth to lat. 4th: Again,

As the Lat. 4th to parallel 12, ſo is the par. ſide of the Square to Lateral Content.

Example, at 9 Inches Square and 20 Foot long.

As lat. 9 to par. 12, ſo is par. 20 to lat. 15, a 4th number: Again,

As lat. 15 the 4th to par. 12; ſo is parallel 9 to lat. 11 $\frac{1}{4}$, the Content required.

Thus much for the General Uſe, being too long a Digreſſion from the matter mainly intended.

Uſe XIII.

The Breadth of any Frame being given, to find the Length of the Rafter and Perpendicular by Inſpection only.

In being a General received Rule, that the Length of the Rafters ſhould be three-quarters the breadth of the Houſe, (or Frame) for true pitch, and 40 the Feet in one Scale, being equal in length to 30 the Number of Feet in another Scale, and 30 being 3 quarters of 40. Therefore,

If you ſeek for the breadth of the Houſe on the 40 Scale, then right againſt it, on the 30 Scale, is the length of the Rafter required. Alſo if you ſeek the length of the Rafter on the 40 Scale, on the 30 Scale, right againſt it, is the height of the Perpendicular required, *viz.* from the Raiſing-piece to the top of the Gable end or Rafter required.

Example, If a Houſe be 30 Foot broad, the Rafter ought to be 22 Foot 6 Inches, and the Perpendicular 16 Foot 9 Inches and a $\frac{1}{2}$; for right againſt 30, counted on the 40 Scale, on the 30 Scale is 22--6 the Rafter, and right againſt 22--6 on the 40 Scale on the 30 is 16--9 $\frac{1}{2}$ the Perpendicular.

1. Alſo by the Line of Numbers, the Extent of the Compaſſes, from 20 to 15, will reach the ſame way from the Breadth of any Houſe to his proprotionable Rafter at true pitch.

2. And the Extent from 20 to 18, turned the ſame way from any Breadth of a Houſe to his proportionable Hip-Rafter, in ſquare Frames.

3. Alſo the Extent from 20 to 11 $\frac{18}{100}$ will reach the ſame way from the width of any Houſe to his proportionable Perpendicular, at ſquare and true pitch.

4. And the Extent from 20 to 28--28, will reach from any other Houſe Breadth to his proportional whole Diagonal Line required, at ſquare and true pitch.

5. And the Extent from 20 the breadth to 26--63 the neareſt diſtance at that breadth, ſhall reach from any other breadth to his proportional neareſt diſtance required, if it were needful. But the Angles in all Roofs great or ſmall, if true pitch and ſquare, are the ſame in all Frames.

Uſe XIV.

The Breadth of the Houſe and the Height of the Perpendicular being given to find the Rafters Length, the Hips Length, the Diagonal Line, from Corner to the King-poſt, and any Angle required, in ſquare Frames. What the Perpendicular Height of the Gable end ought to be at true pitch by the laſt Rule you may readily ſee, and the better make eſtimate of the quantity of alteration. Which being once reſolved on, then thus proceed.

Firſt open the two 30 Scales to a Right Angle by making Lateral 21 Foot 2 Inches ½ a parallel in 15, and 15 in the braſs Center-pins.

1. Then count half the Breadth of the Houſe on one Leg, and the Length of the Perpendicular reſolved on, on the other Leg, then the parallel diſtance between them, meaſured Laterally from the Center, ſhall give the true Length of the Rafter required.

Rafter.

Hips.

2. For the Hips Length count the Length of the Rafter laſt found on one Leg, and the half Breadth of the Houſe on the other Leg, and take the parallel diſtance between, and meaſure it from the Center Laterally, and it ſhall be the true Length of the Hips required.

Diagonal.]

3. For the Diagonal Line, count the half Breadth of the Houſe on both Legs, and take the parallel diſtance between, and meaſure it from the Center, and it ſhall be the Length of the Diagonal Line, from the Corner to the King-poſt.

Hips Length.

4. Again for the Hips count the Diagonal Line laſt found on one Leg, and the Perpendicular height on the other Leg, and the parallel diſtance between ſhall be the Hips true Length meaſured as before from the Center.

Example, In a Houſe of 20 Foot wide at true pitch. See Fig. 1. let A B C D repreſent a Frame of a Houſe 20 Foot wide, B I the half width, B A and C D equal to B C the whole width being 2 points to draw the Diagonal Lines by. I E being equal to I B, and the half E I laid from E to G gives I G the true Length of the Rafters, and G B or G C the Length of the Hips.

Or thus, Three quarters of C B, *viz.* C H gives C F and B F the Rafters Length; the ſame extent alſo laid upon the mid-

dle

dle Line from I to G, gives C G and B G the Hips Length, I F is the Perpendicular Height, E is the Point of the Diagonal Line or King-poſt, perpendicularly oppoſite to or right under the meeting point of the 2 Hips, and the 2 Rafters when raiſed and ſet in their places.

Thus much for Illuſtration what to do, now for Application how to do.

The Width of the Houſe is always given, the Length of the Rafter, or the Height of the Perpendicular is next reſolved on, which in our Example being true pitch is alſo reſolved on, either by Inſpection as before, or elſe by operation in this manner.

1. The Breadth of the Houſe being 20 Foot, and the Perpendicular reſolved on to be 11 Foot 2 Inches $\frac{1}{2}$. To find the Rafters Length, work thus,

Open the 30 Scale to a Right Angle (by Uſe the ſeventh) count 10 the half Breadth of the Houſe on one Leg, and the Perpendicular Height 11 2 $\frac{1}{2}$ on the other Leg, (*viz.* both on the 30 Scale from the Center) and take the parallel diſtance between them, (on the common Line) and meaſure it from the Center, and it ſhall give juſt 15 Foot the Length of the Rafter required C F. For the Rafters Length.

2. But if according to the Width of any Frame, you reſolve on the Rafters Length, and would have the Perpendicular Height of the Gable end, then thus:

Count the Length of the Rafter from the Center, and take the Lateral Extent thereof (being 15) between your Compaſſes, the Compaſſes being ſo ſet, ſet one point in 10 the half Width of the Frame, and turn the other point parallelly to the common Line, and there it ſhall ſhew 11 Foot 2 $\frac{1}{7}$ Inches, the true Height of the Perpendicular at true pitch required. I F 11 Foot 2 Inches $\frac{1}{7}$. For the Perpendicular.

3. For the Length of the Hips, Count the half Breadth of the Houſe on one Leg, and the Rafters Length on the other Leg, and take the parallel diſtance between, and it ſhall give the true Length of the Hips required. As here, the parallel diſtance between 15 and 10, ſhall be Lateral 8, the true Length of the Hips required in a Square Frame 20 Foot wide true pitch. C G. For the Hips Length.

4. For the Diagonal Line from the Corner to the King-poſt.

Count

Half the Diagonal Line. Count the half Width of the House, *viz.* 10 Foot on both Legs, and take the Parallel extent between, and it shall reach from the Center to 14 Foot 1 Inch $\frac{5}{8}$ being the Line C E in the Figure.

Hip. 5. Otherwise for the Hips Length, Count the half Diagonal on one Leg 24 1 $\frac{5}{8}$ and the Perpendicular 11 Foot 2 In. Inches 2 $\frac{2}{7}$ on the other Leg, and the Parallel distance between, measured from the Center, will give the true Hips length 18, *viz.* the Line C G.

Thus much for the Rafters and Hips in Square Frames at true pitch, the measure of whose Angles and Lengths are as followeth,

The breadth of the house being 20 f. and the two ends square, and the Rafters at true pitch, the Lengths and Angles of the Frames, are

	F. Inc. 180 parts	F. 100 parts.		deg. min.
C F Rafter	15 00 00	15 000	Raf- Top	41 50
C G Hip	18 00 00	18 000	ter Foot	48 10
I F Perpendicular	11 02 17	11 180	Hips Top	51 38
B E $\frac{1}{2}$ Diagonal	14 01 68	14 140	Foot	38 22
B I Half Breadth	10 00 00	10 000		
B C Whole breadth	20 00 00	20 000	Difference	13 16
K G Neareſt Diſt.	16 07 50	16 624		
B D Whole Diag.	28 03 36	28 281	Outſid. ang.	116 12

The Rule to find the Angles of the Rafters and Hips.

1. For the Angles that the Rafters make at Foot and Head, with the Raising-piece, and King-post, do thus,

When the Rule stands square in the 30 Scale, then lay any streight piece to the Compass points, when one stands in the half breadth, and the other point in the Perpendicular; then if you apply a Bevel severally, to that streight edge, and the 30 Scale at each end, the one is the Angle at Foot 48--10, and the other the Angle at Head, *viz.* 41--50.

2. For the Angle at Head or King-post, and Foot of the Hips, do thus; the 30 Scale being set square, set one point of the Compasses in the half Diagonal-line; on one 30 Scale, and the other point in the Perpendicular on the other 30 Scale, and to those points lay any streight piece, then set a Bevel

Bevel to that Streight piece, and each 30 Scale, and the one ſhall be the Angle at Foot 38--22, and the other the Angle at the Head, *viz.* 51--38; then this laſt Angle doubled, and the difference between the Angle at head and foot, *viz.* 13--16 added, makes 116--12 the Angle of the outſide of the Hip-Rafter, in a ſquare frame at true pitch required.

3. A General way to find this outward Angle of the Hip or Mould is thus, in any pitch.

Firſt, you muſt find the neareſt diſtance from one Corner to the oppoſite Hip ſet up, or from a point in the raiſing piece, as far from one Corner as the Houſe-end is broad, as the point K or L in the Figure may be done thus.

Count the length of the Hip on one Leg, (and alſo take it between your Compaſſes) and count the breadth of the Houſe on the other Leg, and ſet one point of the Compaſſes in the Hips length on one Leg, aud the other point in the breadth of the Houſe on the other Leg, altering the 30 Scales, but not your Compaſſes; then when the 30 Scales are ſo ſet, one repreſents the Raiſing-piece, and the other the Hip ſet up.

Then the neareſt diſtance from the breadth of the Houſe on one 30 Scale, to the Common-line on the other 30 Scale, is the neareſt diſtance required, being meaſured from the Center, 16-7-$\frac{1}{2}$.

Then take the whole Diagonal Line, *viz.* C L, or B K from the Center Laterally, and make it a Parallel, in the neareſt diſtance laſt found; and that ſhall ſet the 30 Scales to the Angle of the outſide of the Hip required, which you may meaſure in degrees thus: take Parallel 15 as the Rule ſtands, and lay it from the Center, and it ſhall reach to 116 Degrees on the Chords, next one 30 Scale, the Angle of the outſide of the Hips required.

Example, and more briefly in a Houſe 20 Foot broad.

The Houſe-end is 20 Foot broad, the whole Diagonal Line is 28 Foot 3 Inches $\frac{3}{8}$, the Hip-Rafter 18 Foot.

Take 18 Foot between your Compaſſes, and ſet one point in 20, and open or ſhut the Rule till the other fits 18,

then

then the neareſt diſtance from 20 to the Common-Line will be 16 Foot 7 Inches $\frac{1}{8}$.

Then take 28 Foot 3 Inches $\frac{5}{8}$, the whole Diagonal Line, and make it a parallel in 16 Foot 7 Inches $\frac{1}{2}$ the neareſt diſtance, and the 30 Scales are ſet to the Angles required: For,

If you take out Parallel 15 the Chord of 60, and meaſure it Latterally from the Center, it ſhall reach to 116, the Angle in Degrees and Minutes required.

Note, If the whole breadth and whole Diagonal Line is too large for your Compaſſes, then the half breadth and half Diagonal will do as well, (taking the half length of the Hip alſo between your Compaſſes, and on the Scale alſo) and that ſhall ſet the Scales to the ſame Angle as before.

Uſe XV.

To find the Lengths and Angles of the Rafters and Hips, or Sleepers, in Bevelling Frames at any Pitch.

Rafter. 1. For the length of the Rafter, ſet the 30 Scales ſquare, then count the half length of the Bevel-end on one Leg, (being always more there than the half breadth) and the Perpendicular reſolved on, on the other Leg: Then the Parallel diſtance between, meaſured laterally, ſhall be the length of the Rafter required, and a Ruler laid to the two Points of the Compaſſes ſo ſet on the 30 Scales, and a Bevel ſet, as before in Square Frames is ſhewed, ſhall give the Angles at head and foot required.

Hips. 2. For the Hips length, count the Rafters length on one Leg, and the half breadth of the Bevel-end of the Houſe, more by half the number of Inches bevelling on the other Leg, and take the Parallel diſtance between, and meaſure it laterally from the Center, and it ſhall be the length of the longeſt Hip-Rafter. And for the ſhorteſt Hip count leſs than the Bevel-end, by half the number of Inches bevelling, and that ſhall be the ſhort Hip required.

Angle of the Frame. 3. The Inches, or Feet and Inches of Bevelling being given, to find how much one corner is under, and the other over the 90 Degrees (or juſt Square) open the 30 Scales, and take the breadth of the Houſe over at the neareſt diſtance, between your

your Compaſſes, from the 30 Scale from the Center laterally, and make it a Parallel in 15 and 15 for 60 of the Chords.

Then take the Feet and Inches Bevelling from the ſame 30 Scale laterally, and carry it Parallelly till it ſtay in like parts; then juſt againſt it on the Degrees or Tangents are the Degrees and Minutes required, that one corner is more, and the other leſs than 90 Degrees.

4. *To find the Diagonal Line.*

Take the diſtance in the Chords to the Degrees above, or under 90 laſt found, from the Center laterally, and make it a Parallel in 15 and 15, and then the 30 Scales are ſet to the Angle; the end is over, or under 90 Degrees: Then count the whole or half Bevel-end on both Legs, and the Parallel diſtance between ſhall ſhew the length of the whole, or half Diagonal Line meaſured from the Center. Diagonal-lines.

Note, That when the Rule ſtands at the Blunt Angle, it gives the longeſt Diagonal Line; and when it ſtands at the Sharp Angle, it gives the ſhorteſt Diagonal Line.

5. *By the Diagonal Line and Perpendicular to find the Hips Length, and the Angles at Head and Foot of the Hip or Sleeper.*

Count the half Diagonal on one Leg, and the Perpendicular height on the other Leg, (the 30 Scales being Square) then the Parallel diſtance between, ſhall be the length of the Hip required, being longer or ſhorter, as the Diagonal Line is. Hips.

Alſo a Rule laid to the two points of the Compaſſes meaſuring the Parallel Extent, and a Bevel laid to the Rule, and the two 30 Scales, at each end, gives the Angles at head and foot of Hips required. Angles of the Hips.

To find the neareſt Diſtance from the Corner of the Rombus to the oppoſite Hip ſet up in his true place.

6. Count the length of the Hip on one 30 Scale, and take

that

that distance also between your Compasses laterally, count also on the other 30 Scale the length of the Bevel-end, and there set one point of the Compasses, and open or shut the Rule, till the other point falls in the length of the Hip-Rafter first counted (then one 30 Scale represents the Raising-piece, and the other the Hip set up) then the neareſt distance from the breadth of the Frame over, at the Bevel-end and more, or less, by half the Feet and Inches Bevelling, to the Common Line of the other 30 Scale, being measured from the Center shall be the neareſt distance required.

Neareſt Distance.

To find the Angle on the outside of the Hip.

7. To find the Outside Angle of the longeſt Hip, Take the shorteſt Diagonal Line between your Compasses, and make it a Parallel in the neareſt distance belonging to that Hip, and the 30 Scales will be set to the Angle required, and to measure it take Parallel 15 and 15, and measure it laterally from the Center in the Chords; and you shall have the measure of the Angle required.

Outside Angle.

Example; In a House of 20 Foot over at neareſt distance, and 4 Foot or 48 Inches Bevelling out of Square. See Fig. II.

Let A B C D represent a Frame 20 Foot over, and 4 Foot Bevelling, the Bevel end B C is longer than right over by 5 Inches; for if you set the Rule square, and take the Parallel extent from 20 the measure over, to 4 Foot the measure of Bevelling, and measure it Laterally, you shall find it reach Laterally to 20 Foot and 5 Inches, the true length of the Bevel-end.

The Bevel-end being 20, 5 Inches the Perpendicular resolved on, which at true Pitch ought to be about 11 Foot 5 Inches *fere*. Then first for the Rafters Length.

1. Set the 30 Scales square, and set one point in 11, 5 the Perpendicular, and the other point in 10 Foot 2 ½ the half Bevel-end; (and to the Compass-points, lay a Rule, and to the Rule and the 30 Scales at both ends set a Bevel, and one shall be the Angle at foot, and the other at the Angle at the top of the Rafter: And the one Angle will be 42 Degrees for the Foot, and the other 48 for the top of the Rafters) and the measure between

Rafters. Length and Angles.

between the Compaſſes meaſured from the Center ſhall be 15 Foot 4 Inches, the Rafters Length required.

As by Inſpection on the 40 and 30 Scales you may ſee.

2. For the longeſt Hip ſet one point in 12 Foot 2 Inches and ½ more by two Foot, than 10 Foot 2 Inch: ½ the half Bevel-end, and the other point in 15, 4 the Rafters length, and meaſure it from the Center, it gives 19 Foot 6 Inches the longeſt Hip.

Again, Set one point in 8 Foot 2 Inches ½ 2 Foot ſhorter than the half Bevel end, by 2 Foot the half of 4 Foot the Bevelling, and the other point in 15 Foot the Rafters length, and meaſure it from the Center, it gives 17 Foot 4 Inches the length of the ſhorteſt Hip. Hips Length.

3. For the length of both Diagonal Lines, ſet the Scales of 30 to the Angle of the Frame at each corner, and the meaſure from the half, or the whole Bevel-end taken Parallelly, ſhall be the length required of the half or whole Diagonal Line, according as you take the whole or half Bevel-end.

As here in our Example the Blunt-end is 101 gr. 30 min. or 11 30 more than 90 gr. therefore take the diſtance from the Center to 101, 30 on the Chords, and make it a Parallel in (15 and 15) the Chord of 60, then is the 30 Scales ſet to the Angle of the Blunt-end of the Frame, and the Parallel diſtance between 20-5 the whole Bevel-end gives 31 Foot 6 Inches, the whole Diagonal Line, B L, or the Parallel between 10 2 ½ give 15-09 Inches B E the half. Diagonal-lines.

Again, The ſharp end is 78, 30 11 degr. 30 leſs than 90, then the lateral Chord of 78, 30 made a Parallel Chord of 60 (at 15) then is the Rule ſet to the ſharp end of the Frame, for the ſhorter Diagonal Line. And the Parallel diſtance between 10-2 ½ gives 12 Foot 11. the half, or 25 Foot 10 Inches the whole Diagonal Line C F, whoſe half is C E the ſhorteſt whole and half Diagonal Lines.

4. For the Hips Length, and Angles at Foot and Head.

Set the 30 Scales ſquare, and count the ſhorteſt half Diagonal 12 Foot 11 on one Leg, and the Perpendicular 11 Foot 5 on the other Leg, then the Compaſs points ſo ſet, lay a Rule and take the Bevel at both ends, and it ſhall give the two Angles at head and foot of the ſhorteſt Hip, and the ſame diſtance Hips Length.

Hips Length and Angles. of the Compaſs points ſhall be 17 Foot 4 Inches *fere*, the Hip-length, as before, and the Angle at the top 48 30, and at Foot 41 30 his Complement.

Again, Set one point in 15 Foot 10 the longeſt half Diagonal, and the other point in 11 Foot 5 Inches the perpendicular, and lay a Rule to them, and ſet the Bevel to both ends, and you ſhall find 54 gr. the Angle at the top, and 36 the Angle at foot, and the diſtance between the Compaſſes laid from the Center, gives 19 Foot 6 Inches the longeſt Hip.

5. For the Outſide Angles of both Hips, the longeſt firſt.

Take 19 6 between your Compaſſes the Hips length from the 30 Scale: Set one point in 20 Foot 5 the Bevel-end, and cloſe the Rule till the other point touches 19, 6 the Hips length.

Outſide Angle of long Hip. Then take the neareſt diſtance from 18 Foot 5 [2 Foot leſs than 20 Foot 5 the breadth of the Bevel-end of the Frame] to the other 30 Scale, and it is the neareſt diſtance from the point of the *Rombus* A to the Hip B G ſet up, 15 Foot 9 Inches.

Then take out 25 Foot 10 the ſhorteſt Diagonal. and make it a Parallel in 15, 9 the neareſt diſtance, and then the 30 Scales are ſet to the Angle required; for the Outſide of the Long Hip being 110 degrees for parallel 15 meaſured laterally on the Chord, gives 1100.

6. For the Outſide Angle of the ſhorteſt Hip.

Take 17 Foot 4 Inches between your Compaſſes, and ſet one point in 20 Foot 5 the Bevel-end, and open or ſhut the Rule

Outſide Angle of ſhort Hips. till the other point reaches 17 4 on the other 30 Scale. Then the neareſt diſtance from 22 Foot, 2 Foot more than the breadth of the Bevel-end of the Frame to the Common Line on the other 30 Scale, and that ſhall be the neareſt diſtance from L to C G the ſhorteſt Hip ſet up, which is 18 Foot 9 Inches.

Then take out 15 Foot 10 Inches the half greater Diagonal Line, (becauſe 31 Foot 8 Inches is more than the Scale of 30) and make it a Parallel in 9 00 the half of 18 Foot, and the 30 Scales are ſet to the Angle required, *viz.* 122 degrees; for if you take out Parallel 15, and meaſure it in the Chords laterally, it ſhall be 122 the Angle required.

Note here by the way, the length of the Bevel-end, and the two Diagonal Lines, and the halfs of them, and the blunt and ſharp Angles of the Frame, are given by the draught of the

the Frame, and they being firſt known, the work is half done; but if not given, then uſe theſe Directions, which will help you to ſee the reaſon of plain Triangles, and the uſe of the Scales.

Uſe XVI.

To find the Rafters, Hips and Angles in Bevel and Taper Frames, being broader at one end than the other. See Fig. III.

Firſt, when the Frame is broader at one end than the other, then the middle breadth is to be the guide for the Rafters Length, and the Perpendicular to be equal to the middle Rafters perpendicular on both ends; though one pair of Rafters is longer than another, and the Roof in winding thereby: Which winding may many times be remedied by ſome convenient artifice or other, as the ingenious Workman will ſoon perceive. As thus in brief:

Let A B C D repreſent the Frame of a Houſe Bevelling at both ends, and broader by 2 Foot at one end than the other; as here in the Bevelling figure, being 20 Foot on one ſide, and 24 Foot on the other ſide at one Bevel-end 10 Foot 4 Inches, and at the other end 8 Foot 1 Inch $\frac{1}{2}$, but at the neareſt diſtance over, only 10 Foot and 8 Foot.

Firſt, for your more apparent ſatisfaction, draw the true form of the Frame by as large a Scale as you conveniently can, with the Sides and Angles as exact as you can, as A B C D; then draw the middle Line E F quite through the length, and G H through the breadth of the Frame Perpendicular one to the other; then meaſure G H as ſuppoſe 9 Foot, then lay off the half of G H from H to I and K, then take out $\frac{3}{4}$ of G H, and lay it from K and I to L 6 Foot 9 Inches for a pair of middling Rafters for this Taper-Houſe, L G being the common Perpendicular at the middle and both ends of the Roof, 5 Foot 0 Inch $\frac{5}{8}$ of an Inch.

To find the Length of the very principal (or ſingle) Rafter in a Taper Frame.

And for the principal Rafters, or other Rafters, open the 30 Scale ſquare, and then count the Perpendicular 50 $\frac{5}{8}$ on one Leg, and half the diſtance between the Rafter-feet or half breadth of the Frame at that place on the other Leg; and the Parallel diſtance between ſhall be the true Length of the Rafter required.

Then

Then for the Hips Length, firſt make A M and B M equal to A E or B E at one end, and make C N and D N equal to D F or C F, and draw the Lines M M and N N at both ends, alſo make A b and B b equal to A B, and C a and D a equal to C D, and draw the Diagonal Lines A S and B S, and C O and D O at each end extended, and ſet down the meaſures of them.

Theſe Lines being drawn, you have the half Diagonal Lines A S and B S, and C O and D O, and may meaſure them by your Scale, to find their Lengths, or ſet the Rule to the Angles A E S and B E S, find them by the 30 Scale; alſo you have the Bevel-ends of the Frame, and the neareſt diſtance over from ſide to ſide of the Frame.

Then for the Hips Length and Angles thus,

Set the 30 Scales ſquare, and count the Perpendicular Height L G on one Leg 5 0 $\frac{5}{8}$ and each half Diagonal Line, *&c.* one after another on the other Leg, and the Parallel diſtance between ſhall be the true Length of the ſeveral Hips required: Example.

The Parallel diſtance between 5 Foot-0-Inches $\frac{5}{8}$ the common Perpendicular counted on one 30 Scale, and 8 Foot 1 Inch, the longeſt Diagonal Line A S counted on the other 30 Scale ſhall give 9 Foot 6 Inches for the Length of one Hip A P laterally.

And the Parallel diſtance between 5 0-$\frac{5}{8}$ the common perpendicular, and 6 Foot 6 Inches the other Diagonal Line B S ſhall give the lateral meaſure of 8 Foot 3 Inches, the length of B P, the other Hip-Rafter for the broadeſt end of the Frame A B.

Again, the Parallel diſtance between 5 0-$\frac{5}{8}$ the common Perpendicular, and 6 Foot 4 Inches the great Diagonal Line, C O at the narroweſt end ſhall give 8 Foot 1 Inch for the Hip-Rafter C P. And the Parallel diſtance between 5 0-$\frac{5}{8}$ the Perpendicular, and 5 Foot-0-Inch-0- the leſſer Diagonal Line D O ſhall give 7 Foot 2 Inches for the Hips length D P to ſtand over the Diagonal Line D O.

Note alſo, that if to the Compaſs points ſtanding parallelly you lay a Rule, and to the Rule (ſo laid) and the 30 Scales

at

at each end a Bevel, and ſet it according to the Rule and 30 Scales, it ſhall give the true Angle of the Hips at the Raiſing-piece and King-poſt, which 8 Angles in theſe 4 Hips are expreſt by the Lines and Letters in the Scheme thus: P A S and P B S, P D O and P C O the 4 Angles at the Raiſing-piece. And S P A and S P B, O P C and O P D the 4 Angles at the King-poſt.

Whoſe length you may prove by Mr. *Pope*'s excellent way, making S P and O P equal to L G on the extended Diagonal Line, and drawing the Lines A P, B P, C P, D P, for the 4 Hip-Rafters length required.

Or for more proof thus alſo by the Rule, as before in Square Roofs.

Set the 30 Scales Square, and take the Parallel Extent, from 7 Foot 2-$\frac{3}{4}$- the Rafters length at the broader end, on one 30 Scale, to 6 Foot 2 Inches more, then $\frac{1}{2}$ the Bevel-end by 1 Foot the half quantity of Bevelling, and it ſhall give 9 Foot 6 Inches for the Hip A P, and from 7-2-$\frac{3}{4}$- to 4-2, one Foot leſs than the half Bevel-end, to 8 Foot $\frac{3}{4}$ the Hip B P. Alſo the Par. extent from 6 Foot 5-$\frac{1}{2}$ the Rafters Length at the leſſer end, to 5 Foot 0-$\frac{3}{4}$ one Foot more than 4-0-$\frac{3}{4}$ the half little Bevel-end, ſhall give 8 1-$\frac{1}{2}$ for the Hip P C. And the Extent, from 6-5-$\frac{4}{8}$ the Rafters length, to 3-0 $\frac{3}{4}$ 1 Foot leſs than the half Bevel-end, gives 7-1-$\frac{1}{2}$ the Hip D P, as before.

Note, That by the working theſe 3 ways, you may be ſure to prevent any miſtakes that may happen in working one way only.

Laſtly, For the Angles on the outſide or backs of the Hips.

Take every ſeveral Hips Length laterally between your Compaſſes, and ſet one Point in the Length of the Bevel-end, (or rather in a mean between A B the Bevel-end, and M M at the greater end, or C D and N N at the leſſer end) and open or ſhut the 30 Scales till the other Point falls on the Hips Length that you work for, then for the longer Hip count more, and for the ſhorter Hip leſs, by half the Inches Bevelling, then the whole breadth over, at the end, and take the Parallel neareſt diſtance from thence to the 30 Scale for a neareſt diſtance, which neareſt diſtance you muſt keep.

Then take the whole Diagonal Line Perpendicular to the Hip,

Hip, wrought for (*viz.* the ſhorteſt Diagonal Line for the longeſt Hip at each end) between your Compaſſes, and make it a Parallel in the neareſt diſtance laſt found, and then the 30 Scales are ſet to the Angle of the back of the Hip required.

Example in this Figure for the longeſt Hip.

Take 9 Foot 6 Inches, the Hips Length A P between your Compaſſes, and ſet one point in 10 Foot one Inch (a mean between A B 10 Foot 4, and M M 9-10 $\frac{1}{2}$) and open or ſhut the Rule, till the other point ſtands in 9 Foot 6, the Hips length firſt taken. Then the neareſt diſtance from 9 Foot 4 Inches, one Foot leſs than 10 f. 4 Inch. the Bevel-end diſtance over, to the other 30 Scale ſhall give 7 10 a neareſt diſtance from the point b to A P the Hip raiſed over A S the Diagonal.

Then the Lateral Extent B b of the whole Diagonal Line 12 f. 7 Inch. being made a parallel in 7 10 the neareſt diſtance laſt found, ſhall ſet the 30 Scales to the Angle at R the back of the Hip required meaſured by taking Parallel 30, and meaſuring at laterally on the Chords it is about 108 Degrees.

Secondly, Take 8 f. 4 Inches, the other Hips Length between your Compaſſes, and ſetting 1 point in 10 f. 1 Inch as before, open or ſhut the Rule till the other point falls in 8, 4 the Hips Length.

Then the neareſt diſtance from 11 Foot 4 Inches, 1 Foot more than 10 Foot 4 Inches the diſtance of the Bevel-end to the Common Line of the other 30 Scale ſhall be when meaſured Laterally from the Center 9 Foot *fere*, for a neareſt diſtance.

Then 15 Foot 8 Inches the longer Diagonal Line being made a Parallel in 9 Foot *fere*, the neareſt diſtance laſt found, ſets the 30 Scales to 121 Degrees the Angle required, the back of the ſhorter Hip required.

The ſame work ſerves for the other end, being near the ſame Angles: Which you may prove by M. *Will. Pope*'s excellent way, thus: find the middle between S and A, or S and B at Q, then the neareſt diſtance from Q to B P or A P near lay to R, and draw the Lines R E, R M for the Angles at R the back of the Hips required.

Moreover, if you raiſe 4 Perpendiculars cutting the Points O and S, the two places of the King-poſts being perpendicular to the Raiſing-pieces A C and B D, as the 4 Prick-lines

lines ♉ S, ♍ S, ♌ O, and ♊ O do ſhew, and lay the length of each Hip from his proper corner A B C D as A P from A to ♈ and ♍. B P from B to ♈ and ♉, D P from D to ♊ and ♋, C P from C to ♌ and ♋, then draw lines from point to point, as in the Figure.

Then ♍ ♌ and ♉ ♊ are the two Ridges when turned right over O S, and C ♋ D is the leaſt Hip, and A ♈ B is the greater Hip, as Mr. *Pope* hath well ſhewed. Thus much for Hipt Roofs.

uſe XVII.

To find the Length and Angles of every Principal particular Rafter in Frames broader at one end than the other.

The Perpendicular, as before was hinted, is to be the ſame all over the Roof. Therefore open the Rule Square, and take from the Perpendicular on one Leg, to the half breadth of the Frame on the other Leg, meaſure it from the Center, and that is the Length required. For the Angles lay a Rule to the Compaſs-points, and ſet a Bevel, as before is ſhewed, and you have the Angles at the Raiſing-piece, (and Ridge of the Houſe) to cut the Rafters feet by.

The ſame Rule ſerves to draw out a pair of Well-Stairs, to give Hypothenuſaes, or ſtrings, at any particular height and breadth; for the 30 Scales ſet Square, and the Perpendicular height counted on one Leg, and the breadth on the other Leg, the meaſure between is always the Hypothenuſa, or ſtring in flying Stairs, as may plainly appear.

uſe XVIII.

To find the Length and Angles of Collar-Beams in any Roof.

Take the whole breadth of the Frame between your Compaſſes, and ſet one point in the Length of the Rafter on one Leg, and the other point in the ſame place on the ether Leg: then the two Legs repreſent the two Principal Rafters, and a Rule laid to the Compaſs-points repreſents the Raiſing-piece; then at any height that you pleaſe above the Raiſing-piece,

apply a Rule parallel to it, and the meaſure between laid from the Center, gives the length, (remembring to add wood for the Tenons) and a Bevel laid to the 30 Scale, and Rule, gives the true Angle to cut it by, (where the Timbers be ſquare.)

uſe XIX.

To find the Lengths and Angles of Rafters, and Furloyns in Bevel Frames.

The Length of the Rafters is ſhewed before, to find it by the half breadth of the Square or Bevel-end, and the Perpendicular anſwerable to that Roof, (as afterwards in the Example.) And the Angle of the Foot, and outſides or backs of the Bevel-end Rafters, and the upright of the Gable end, muſt be to an Angle leſs and more than 90 degrees by the Angle at the corner of the Frame where that Rafter is to ſtand, being more at the ſharp Angle, and leſs at the blunt Angle, as in Figure IV you may ſee; the true quantity of which Angle is thus found by the Rule.

Take the Length of the Rafter for the Bevel-end in Feet and Inches, and make it a Parallel in 15, then half the quantity of Feet and Inches Bevelling, taken from the ſame Scale, and carried parallelly till it ſtay in like parts, ſhall ſhew right againſt it in the Tangents the Degrees and Minutes required.

And this is the Angle that the blunt corner is to be laid in Legement more than a ſquare, and the ſharp Angle leſs than a Square or 90 Degrees, both out of Level, and out of ſquare alſo, when you tumble or ſtripe in, the Tenons of the Purloins, the thing deſired.

Example, Let A B repreſent the Bevel-end of a Frame, being out of Square from the Line A C 6 foot, as the Line C B ſheweth; then if A C be 20 foot, A B will be 20 Foot 10 Inches. Then draw E L the middle Line of the Frame, and G M and H K, the Lines at three quarter of the breadth of the Frame, then take E D the half Bevel, and lay it from G to F, and from H to I, and draw the Lines A F and B I, for the outſide Lines of the two Bevel-end Rafters: end the two other Lines parallel to them, according to the Breadth or Scantling of your Bevel-end Rafters, as here in the figure 8 Inches broad.

Thus

Thus the Lines A F and B I repreſent the two end Rafters, laid in Legement to fit in the Purloins, as for their lying out of Square from the Raiſing-pieces. And to the ſame Angle they are to be laid out at Level, that the cutting of the Purloin ends may fit the Rafter ſides, when erected in their places, according as the ends F and I of the Bevel-end Rafters are, according to the Angles A F G and A F M, the one being 11 degrees and 20 minutes under, and the other 11, 20 above 90 degrees.

Alſo, Note that if P K and O M do repreſent a pair of ſquare Rafters, at any intended diſtance from A, then T S and R Q will give the true Length of the Purloins fit for thoſe places, R Q being the ſhorteſt Purloin, and T S the longeſt Purloin.

To find by the Rule only how long the Purloin muſt be on the outſide more or leſs than the diſtance on the Raiſing-pieces, where you intend the two Square Rafter feet ſhall ſtand, do thus: ſet the 30 Scales to the ſame Angle that the Bevel-end Rafters lie out of Square, when they lie in Legement, to frame which here is to 11 degrees and 20 minutes.

Then count from the Center the quantity of Feet and Inches you intend to make the Mortiſe-holes from the Rafter Foot, in the Rafters, for the Tenons of your Purloins; and take from thence to the neareſt diſtance to the other Line, and that ſhall ſhew the quantity that the one Purloin is to be longer, and the other ſhorter, than the diſtance between the Rafter-feet on the Raiſing pieces. Example thus:

Set the 30 Scales to the Angle G A F, then count A S the place for the Mortiſe-hole from A on the Rafter, and take the neareſt diſtance from thence to the other 30 Scale that ſhall give S V, the quantity how much T S is ſhorter than A O, and how much R Q is longer than P B.

Note, that if you count 3 quarters of 20 Foot 10 Inches, being the Length of the Bevel-end, that then you will make the Rafters too long by 4 Inches and a half, as in the Figure you may ſee: therefore the ſureſt way to find the Rafters Length is to ſet the Scales to a Square, and then to take the Parallel Extent from the Common Perpendicular, to the $\frac{1}{2}$ breadth between the place for the Rafter-feet on the Raiſing-piece: So that the Length of the Rafters for the Bevel-end at true pitch, is A F 15 Foot 3 Inches, and not A W 15-7-$\frac{1}{2}$, which is

juſt 3 quarters of AB the Bevel-end over which the two Rafters are to ſtand. For then the top of the Bevel-end Rafters would be too high for the top of the Square Rafters being cut juſt 15 Foot, three quarters of 20 Foot the breadth of the Frame.

Uſe XX.

The Uſe of the Scales to lay down or meaſure out on Paper, or Board, the Members and Parts of the fine Columns, and their Ornaments, with their names and meaſures, digeſted into a Table, for the more eaſe and uſe of Workmen.

For the drawing of the fine Columns and their Ornaments is largely before treated of in the former part, by models, minutes and quarters, and conſidering the harmony between it and our Scales to 30, that are parted into 12 parts, ſo that when every Figure or Foot, on the Scales to 39 repreſent a model, then every Inch is 5 minutes; and for ſmall Paper-draughts, that way of counting is near enough; but when you uſe it for a bigger draught, that the whole Scale of 30 may repreſent 3 models only: then every Figure will repreſent 6 minutes, and the 12 Inches between are half minutes: but in very great Work, as in Temples, or Caſtles, then the whole Foot or Scale to 30 may repreſent half of one Model only, and then every Figure or Foot is a Minute, and every Inch or ſmall diviſion is the 12th part of a Minute; for I count it to be a large Column, whoſe Diameter at the Baſe (which is a Model) is above 3 Foot, and by this manner of computation, which is natural to moſt Scales, the Scales to 30 may be rendred convenient for ſmall, or moderate, or large uſes, as in the following Examples may ſomewhat appear.

In reading of which you muſt have recourſe to the former Figures, whoſe Members are marked with 1 2 3 4 5 6 7 8 9 10, and which Figures direct you to the names in every of the Columns which I found to be wanting in the former part, ſo that the method here uſed is thus:

1. The firſt Column in the Table is 1 2 3 4 5 6 7 8 9 10 11 12, &c. anſwerable to the Figures on the 6th Figure, in our preſent Example, which will ſtreightway guide you to the meaning of the names or terms in the Table by comparing it and the figure together, whereby you may readily find every part or member, and its proper name.

2. The

2. The ſecond Column is the names of the Part or Member in the groſs and particular alſo, as the Pediſtal, the Baſe, the Shaft, the Capital, the Architrave, Frieze, and the Cornice, are the names in groſs; the other are the names of the members in particular.

3. The third Column in the Table is the ſeveral meaſures of the particular members, in Models, Minutes, and Quarters, as in the Figures, though more eaſily to be ſeen than in the Figures, becauſe of the ſtraightneſs of the room there.

4. The fourth Column in the Table is the meaſure of every particular part and member from the Pediſtal, Baſe or bottom, to the top of the Cornice, being uſeful in ſmall draughts where the whole Pillar is expreſt.

5. The fifth Column in the Table is the ſeveral meaſures of every particular member of each groſs part, being uſeful when you draw large draughts of any Work, or part thereof.

6. The ſixth Column in the Table is the meaſure of the Projecture of every particular part from the middle Line of the Column (or from the ſmalleſt or moſt inward part of the Pillar, the reſt being ſubſtracted) but I judge the middle Line to be the beſt Epocha to begin the account of projecture for the conveniency of the Compaſſes: and this Table of Projectures as all the reſt, is to Models, Minutes, and Quarters; as by trial you may ſee at one view what each groſs part and every particular part is.

The Names and Number of the Members of the *Tuſcan* Column in Height and Projecture.

Num.		A Table for the *Tuſcan* Order. Names of the parts and members.	Each part from the Baſe mod.	min.	q.	*M.*	*m.*	*q.*	Each groſs part alone *M.*	*m.*	*q.*	The proj. or middle *M.*	*m.*	*q.*
1	*Pediſtal.*	*The lower Faceo, or Plint, of the Pediſtal*	0	30	0	0	30	0	0	30	0	0	42	0
2		*The Pediſtal Body, or Stilobatum*	1	0	0	1	30	0	1	30	0	0	40	0
3		*Abacus, the Caſement, or hollow*	0	5	2	1	35	2	1	35	2	0	41	0
4		*Tinea, the Liſt, or Square, or Rabit*	0	1	2	1	37	0	1	37	0	0	46	0
5		*The Architrave or Faceo*	0	12	0	1	49	0	1	49	0	0	47	0
6		*The upper Liſt of the Pediſtal*	0	3	2	1	52	2	1	52	0	0	46	1
7	*Baſe.*	*The Plint, of the Baſe of the Column*	0	18	0	2	10	2	0	18	0	0	42	
8		*The Thorus, or Rondel, or Breſt*	0	12	0	2	22	2	0	30	0	0	42	
9		*The Liſt, or Fillet, or Spira*	0	03	0	2	25	2	0	33	0	0	36	
10	*Shaft.*	*The Shaft or Body of a Col.* at the Baſe	6	22	0	8	47	2	6	22	0	0	30	0
		at the Capit.										0	22	2
11	*Capital.*	*The Liſt*	0	1	2	8	49		0	1	2	0	24	
12		*The Rondel or Aſtragal*	0	3	2	8	52		0	5	0	0	26	
13		*The Neck or Freize*	0	8	2	9	01	0	0	13	2	0	22	2
14		*The Liſt*	0	1	2	9	2	2	0	15	0	0	24	
15		*The Rondel, or Bead-molding*	0	2	2	9	5	0	0	17	2	0	26	
16		*The Echinus, or Half-round*	0	7	2	9	12	2	0	25	0	0	30	
17		*The Plint of the Capital*	0	10	0	9	22	2	0	35	0	0	31	2
18	*Architrave, Frize and Corniſh.*	*The firſt Faceo*	0	10	0	9	32	2	0	10	0		22	2
19		*The ſecond Faceo*	0	15	2	9	48	0	0	25	2		24	2
20		*The Liſt or Supercilium*	0	1	2	9	49	2	0	27	0		26	2
21		*The Plint*	0	3	2	9	53		0	30	2		27	2
22		*The Zoporus, Epiſtylum or Frize*	0	40	0	10	33	0	1	10	2		22	2
23		*The Liſt or Supercilium*	0	2	0	10	35	0	1	12	2		23	2
24		*The Scimatium or little* OG	0	5	0	10	40	0	1	17	2		26	2
25		*The Supercilium or Liſt*	0	1	1	10	41	1	1	18	3		30	0
26		*The Scima or greater* OG	0	8	2	10	49	3	1	27	1		35	
27		*The Liſt*	0	1	2	10	51	1	1	28	3		49	0
28		*The Corona or Crown*	0	9	3	11	01	0	1	38	2		50	
29		*The Liſt*	0	1	2	11	2	2	1	40	0		52	
30		*The upper Scima or* OG	0	8	0	11	10	2	1	48	0		56	
31		*The Supercilium, Liſt, Tinea, or Eybrow*	0	1	0	11	12	0	1	49	2	1	00	0
32		*The upper Liſt or Plint of the Corniſh for the Tuſcan Column or Order*	0	3	0	11	11	0	1	52	0	1	02	0

Thus I have given you an Example of the *Tuſcan* Order of the meaſure of every Part and Member: the like may you make, from the Figures in the Book, of all the other Orders, for your particular uſe and occaſion.

F I N I S.

The ſaid Rule with all other Mathematical Inſtruments are made and ſold by *John Browne*, living in the *Minories* at the Sign of the Sun-Dial, and by *Walter Henſhaw* in *Eaſt-Smithfield* near the *Hermitage*.

There is alſo to be ſold by *William Fiſher* at the *Poſtern* at *Tower-Hill*, a very uſeful Book, Entituled, *The Deſcription and Uſe of the Carpenters Rule, together with the Uſe of the Line of Numbers*, commonly called Mr. *Gunter*'s *Line*. Alſo the Book of *The Five Columns of Architecture*, by *Hanc Bloome*.

THE

GROUND-RULES

OF

Architecture,

Collected from the best Authors and Examples,

BY

That Learned and Ingenious Gentleman

Sir *HENRY WOTTON*,

IN HIS

Elements of ARCHITECTURE.

Now contracted for Publick Benefit.

LONDON:

Printed in the Year MDCLXXXVI.

THE GROUND-RULES OF ARCHITECTURE.

THere are ſeveral Rules or Precepts laid down by Architects concerning the Art of well Building, ſome reſpecting the ſituation or total poſture of the Building; as that it be in a good and healthy air, not ſubject to foggy noiſomeneſs or mineral exhalations, or malign influence; that it be not far from ſome navigable River or arm of the Sea; that it have a pleaſant proſpect, and the firſt ſalutation of the Spring: But I paſs over theſe, accounting them rather wiſhes than precepts.

Other Rules there are touching the placing of the ſeveral parts of the Building: As that all the principal Chambers of delight, all Studies and Libraries be towards the Eaſt, the morning being a friend to the Muſes; all Offices that require heat, as Kitchins, Stillatories, Stoves, Rooms for Baking, Brewing, Waſhing or the like, towards the South. All that need a cool and freſh temper, as Cellars, Pantries, Butteries, Granaries, to the North: As alſo Repoſitories for works of Rarities in Pictures, or other Arts that require a ſteady light. But in this, regard is to be had to the nature of the Region, every Nation being tyed above all Rules to a diſcretion of providing againſt their own inconveniences.

The Rules concerning the work it ſelf, ſome reſpect the materials, and ſome the form; as concerning the material part it will not diſgrace an Architect, which doth ſo well become a

Philoſopher, to look into the properties of Stone and Wood, as that Firr-Trees, Cypreſs, Cedars, and ſuch other aſpiring Plants (which being naturally inflexible downwards) are fitteſt for Poſts and Pillars, or ſuch upright uſe; on the other ſide Oak and the like true hearty Timber being ſtrong in all poſitions, may be better truſted in croſs and traverſe work for Sommers, or girding and binding beams, as they are termed And ſo likewiſe to obſerve of ſtone, that ſome are better within than other to bear weather; nay to deſcend lower, to examine Sand, Lime and Clay, of all which things *Vitruvius* and other new Writers have diſcourſed without any daintineſs. And in this the *Italians* are very careful, burning their firmeſt Stone, and even fragments of Marble, where it is plenty, which in time become almoſt marble again, or at leaſt of indiſſoluble durity, as appeareth in their ſtanding Theatres: whereas to make Lime of any refuſe ſtuffe, as we too commonly do in *England*, is an error of no ſmall moment in our Buildings. I ſhall cloſe with this principal caution, That ſufficient ſtuff and mony be ready before we begin to Build; for when we build now a piece and then another by fits, the work dries and ſinks unequally, whereby the Walls grow full of chinks and crevices; this pawſing humour is condemned by all Authors. In the form is to be conſidered the general figuration, and then the ſeveral members. Figures are either ſimple or mixed, the ſimple figures are either Circular or Angular, and of Circular either complete or deficient as Oval: Now the exact Circle is in truth a very unprofitable Figure in private Buildings, being the moſt chargeable, and much room being loſt in the bending of the Walls, beſides an ill diſtribution of the light except from the Center of the Roof, ſo as it is not uſual, ſave in ſome Temples and Amphitheatres; the Oval and other imperfect Circular Forms have the ſame exceptions and leſs benefit of capacity.

Touching the Angular it is a true obſervation, that this Art doth neither love many Angles nor few, for firſt the Triangle which hath of all others the feweſt ſides and corners, is of all other the moſt condemned, being indeed both incapable and infirm, and likewiſe more ſoluble into any other Form than it ſelf in the inward Partitions: As for Figures of five, ſix, ſeven or more Angles, they are fitter for Military Architecture,

Architecture, where the Bulwarks may be laid out at the Corners, and the ſides ſerve for the Curtains then for civil uſe, though there is a famous piece at *Caparola* belonging to the Houſe of *Farneſe*, caſt by *Baraccio* into the form of a Pentagone with a Circle inſcribed; where the Architect did ingeniouſly wreſtle with divers inconveniences in diſpoſing of the Lights and in ſaving the vacuities: but ſuch deſigns as theſe do aim more at Rarity than Commodity, and are rather to be admired than commended. Therefore by the precepts and practice of the beſt Builders we reſolve upon Rectangular ſquares, as a mean between too few and too many Angles, and are through the equal inclination of the ſides (which make the right Angle) ſtronger than the Rhomb or any other irregular ſquare; but whether the exact Quadrat or the long ſquare be the better, is not well determined, though I prefer the latter, provided the length do not exceed the Latitude above one third part, which would much diminiſh the Aſpect; as ſhall appear when I come to ſpeak of Symmetry and Proportion of mixed Figures, partly Circular and partly Angular. There is a proper Objection, that they offend uniformity, yet theſe ſeeming oppoſites, Uniformity and Variety, may be reconciled; as we ſee in our Bodies, the great pattern of Nature, which are moſt uniform in the whole figuration, each ſide agreeing with the other in the number, the quality and meaſure of the parts, and yet ſome are round as the Arms, ſome flat as the Hands, ſome prominent, and ſome more retired, ſo the limbs of a noble Fabrique may be correſpondent enough they be various, provided always we do not run into certain extravagant inventions, whereof I ſhall ſpeak more largely when I come to the parting and caſting of the whole work. We ought likewiſe to avoid enormous heights of ſix or ſeven ſtories, as well as irregular Forms, and the contrary fault of low diſtended Fronts is as unſeemly, or again when the face of the Building is narrow and the flank deep. Thus much for the general Figuration or Aſpect of the work.

Now concerning the parts in ſeveral, all the parts of every Fabrick may be according to *Baptiſta Alberti* compriſed under five Heads, and they be theſe.

The Foundation.
The Walls.
The Appertions or Overtures.
The Compartition.
And the Cover.

About all which I purpoſe to gather the principal Rules, and as I paſs along touch the natural Reaſons of Art.

Firſt concerning the Foundation, which requireth the exacteſt care; for if that happen to dance, it will mar all the mirth in the Houſe. Therefore that we may found our Habitation firmly, we muſt firſt examine the bed of Earth upon which we will build, and then the underfillings or ſubaſtraction, as the Ancients did call it, adviſing us not to reſt upon any appearing ſolidity, unleſs the whole mould through which we cut have likewiſe been ſolid. But how deep we ſhould go in this ſearch, is not certainly determined, depending more upon diſcretion than regularity, according to the weight of the work; yet *Andrea Palladio* alloweth a ſixth part of the height of the whole Fabrick, unleſs the Cellars be under ground; in which caſe he would have us found ſomewhat lower.

Some *Italians* do preſcribe, that when they have choſen the floor or plot, and laid out the limits of the work, we ſhould firſt of all dig Wells and Ciſterns and other underconducts and conveyances for the ſuillage of the Houſe, whence may ariſe a double benefit; for both the nature of the mould or ſoil would be ſafely ſearched, and moreover thoſe open vents will ſerve to diſcharge ſuch vapours as having otherways no iſſue might peradventure ſhake the building; This is enough for the natural grounding, which though it be not a part of the ſolid Fabrick, yet it is here fitteſt to be handled.

Now followeth the ſubſtruction or ground-work of the whole Edifice, which muſt ſuſtain the Walls, about which are theſe Rules, firſt that the bottom be preciſely level, where the *Italians* therefore commonly lay a platform of good board, then that the loweſt ledg or row be meerly of ſtone, and the broader

broader the better, closely laid without mortar, which is a general caution for all parts in building that are contiguous to board or timber, because lime and wood are insociable, and if any where unfit confiners, than most especially in the Foundation; thirdly, that the breadth of the substruction be at least double to the insistent Wall, and more or less as the weight of the Fabrick shall require; for Discretion may be freer than Art.

Now the Foundation being searched; and the substruction laid, we must next speak of the Walls.

Walls are either entire and continual, or intermitted, and the intermissions be either Pillars or Pilasters; concerning the entrie Walls there are these considerations. That the Walls be most exactly perpendicular to the ground-work; for the right Angle (thereon depending) is the true cause of stability both in artificial and natural positions, a man likewise standing firmest when he stands uprightest. That the massiest and heaviest materials be the lowest, as fitter to bear than to be born. That the work as it riseth, diminisheth in thickness proportionally for ease both of weight and expence. That certain ledges of more strength than the rest be interlayed like bones to sustain the Fabrick from total ruine, if the under parts should decay. Lastly, that the Angles be firmly bound, which are the Nerves of the whole Edifice, and therefore are commonly fortified by the *Italians* even in their brick buildings, on each side of the corners with well squared stone, yielding both strength and grace. And so much touching the entire or solid Wall.

The intermissions (as hath been said) are either Pillars or Pilasters.

Pillars, which are commonly called Columns, of them there are five Orders.

The Tuscan.
The Doriqne.
The Ionique.
The Corinthian.

And

And the *Compound Order*, or as ſome call it, the *Roman*, others more generally the *Italian.*

In which five Orders I will firſt conſider their Communities, and then their Proprieties.

Their Communities (as far as I obſerve) are principally three: Firſt, they are all round; for though ſome conceive *Columnæ Atticurges* mentioned by *Vitruvius* to have been a ſquared Pillar, yet we muſt paſs it over as irregular, never received among theſe Orders, no more than certain other licentious inventions of wreathed and vined and Figured Columns.

Secondly, they are all diminiſhed or contracted inſenſibly more or leſs, according to the proportion of their heights from one third part of their Shaft upwards, which *Philander* doth preſcribe by his own preciſe meaſuring of the ancient remainders as the moſt graceful Diminution. And here I muſt blame a practice familiar in ſome places, of making Columns ſwell in the middle as if they were ſick of ſome Timpany, unſeemly to the very judgment of ſight, and contrary to the Original and Natural Type in Trees, which at firſt was imitated in Pillars, as *Vitruvius* himſelf obſerveth.

Thirdly, they have all their Underſettings or Pedeſtals in height a third part of the whole Column comprehending the Baſe and Capital, and their upper Adjuncts, as Architrave, Frize, and Cornice, a fourth part of the ſaid Pillar. Which rule of ſingular uſe and facility I find ſetled by *Jacobo Baraccio* a very good Author. Theſe are their moſt conſiderable Communities and agreements.

Their Proprieties or Diſtinctions will beſt appear by ſome reaſonable and plain deſcription of them all with their Architraves, Frizes and Cornices.

Firſt therefore the *Tuſcan* is a plain maſſy rural Pillar, reſembling ſome ſturdy well-limbed Labourer homely clad, as *Vitruvius* makes the Compariſon: The length thereof ſhall be ſix Diameters, or as *Scamozzi* makes it, ſix and a half of the groſſeſt of the Pillar, being a very natural proportion. The diſtance or Intercolumniation may be near four of his own Diameters, becauſe the materials commonly laid over this Pillar were rather of Wood than Stone,

ſtone, through the lightneſs whereof the Architrave could not ſuffer though thinly ſupported, nor the Column it ſelf being ſo ſubſtantial. The Contraction aloft ſhall be (according to the moſt received practice) one fourth part of his thickneſs below. To conclude, the *Tuſcan* is of all the rudeſt Pillar, and his principal Character ſimplicity.

The *Dorick Order* is the graveſt that hath been received into civil uſe, preſerving in compariſon of thoſe that follow a more Maſculine Aſpect, and little trimmer than the *Tuſcan* that went before, ſave a ſober garniſhment now and then of Lions heads in the Cornice, and of Trigliphs and Metopes always in the Frize, ſometimes likewiſe, but rarely, channeled, and a little ſlight ſculpture about the Hypotrachelion or neck under the Capital: the length ſeven Diameters, and according to *Scamozzi* ſeven and a half, his rank or degree is the loweſt by all congruity, as being more maſſie than the three, and ſo better able to ſupport. The Intercolumniation thrice as much as his thickneſs below; the contraction aloft one fifth of the ſame meaſure, he is beſt known by his place when he is in Company, and by the peculiar Ornament of his Frize before mentioned when he is alone.

The *Ionick Order* doth repreſent a kind of Feminine ſlenderneſs, not like a light Houſewife, but in a decent Matron-like dreſſing. The length eight Diameters in degree as in ſubſtantialneſs next above the *Dorick*, ſuſtaining the third, and adorning the ſecond ſtory, the Intercolumniation two of his own Diameters, the contraction above one ſixth part. And is beſt known by his trimmings, for the body of this Column is perpetually channeled like a thick plaited Gown; the Capital dreſſed on each ſide, not much unlike womens Wires in a ſpirial wreathing, which they call the *Ionian Voluta*; the Corniee indented; the Frize ſwelling like a Pillow, theſe are his beſt Characters.

The *Corinthian* is a Column laſciviouſly decked like a Curtizan, and therein participating (as all Inventions do) of the place where they were firſt born, *Corinth* having been without controverſie one of the wantoneſt Towns in the World. This Order is of nine Diameters, his degree one ſtage above the *Ionick*, and always the higheſt of the ſimpleſt Orders.

The Intercolumniation two of his Diameters, and a fourth part more, which is of all other the comlieſt diſtance. The contraction one ſeventh part. In the Cornice both Dentils and Modiglions. The Frize adorned with all kinds of Figures and various Compartments. The Capital cut into one of the beautifulleſt leafs that Nature doth yield, which is the Acanthas or *Branca Urſina*, Bears Foot. In ſhort, as Plainneſs did characterize the *Tuſcan*, ſo muſt Delicacy and variety the *Corinthian* Pillar, beſides the height of his Rank.

The laſt is the Compounded or *Roman Order*, his name being a brief of his nature; for this Pillar is nothing in effect but a medly of all the precedent Ornaments, and though, the moſt richly trimmed, yet the pooreſt in this that he is a borrower of all his beauty. His length a mean between the *Ionick* and *Corinthian* according to *Scamozzi*: though ſome will have him the higheſt, as of ten Diameters, the contraction one eighth part leſs above than below, his degree ſhould be the higheſt, but few Palaces ancient or modern exceed the third of the Civil Orders; you may eaſily know him by the mixture of his Ornaments. And ſo much touching the five Orders of Columns, which I ſhall conclude with two or three not impertinent Cautions.

Firſt, That where more of theſe Orders than one ſhall be ſet in ſeveral Stories or Contignations, there muſt be an exquiſite care to place the Columns preciſely one over another, that ſo the ſolid may anſwer to the ſolid, and the vacuities to the vacuities; as well for beauty as ſtrength of the Fabrick; and by this Caution the conſequence is plain, that when we ſpeak of the intercolumination or diſtance which is due to each Order, we mean in a *Dorick*, *Ionical*, *Corinthian* Porch, or Cloiſter, or the like of one Contignation, and not in ſtoried buildings.

Secondly, Let the Columns above be a fourth part leſs than below, ſaith *Vitruvius*; which doth appear a ſtrange Precept, and would ſeem reaſonable rather to make them a fourth part bigger, becauſe according to the Optick Rule that the higher they are the leſs the diminution aloft ſhould be, becauſe the Eye doth naturally contract all objects more or leſs according to their diſtance; but *Vitruvius* acquits himſelf like

like a wiſe Mechanick, the Natural reaſon before the Mathematical.

That therefore they above ſhould be a fourth part leſs, that thoſe beneath may better ſuſtain them.

A third Caution ſhall be, That all the projected or Jutting parts (as they are termed) be very moderate, eſpecially the Cornices of the lower Orders ; for while ſome think to give them a beautiful and royal Aſpect, by their largeneſs they ſometimes hinder both the light within, and likewiſe detract much from the view of the Front without. I need ſay no more concerning Columns and their Adjuncts, only anſwer one familiar Objection: It will perchance be ſaid, that this Doctrine touching the five Orders were fitter for the Quarries of *Aſia* which yielded one hundred and twenty ſeven Columns of ſixty foot high to the *Epheſian* Temple, or for *Numidia* where Marbles abound, then for the Spirits of *England*, who muſt be contented with more ignoble materials. To which I anſwer, that this need not diſcourage us. For I have often at *Venice* viewed with much pleaſure an Antiporch after the *Greek* manner raiſed by *Andrea Palladio* upon eight Columns of the Compounded Order, the Baſis of ſtone without Pedeſtals, the ſhafts or bodies of meer brick three foot and a half thick in the Diameter below, and conſequently thirty five foot high, than which mine eye hath never yet beheld any Columns more ſtately of ſtone or marble; for the Bricks having been firſt formed in a Circular mould, and then cut before their burning into four quarters or more, the ſides afterwards joyn ſo cloſely, and the points concentre ſo exactly, that the Pillars appear one entire piece; which ſhort deſcription I could not omit, that thereby may appear how in truth we want rather Art than Stuffe to ſatisfie our greateſt fancies.

After Pillars the next in order are Pilaſters, touching which I will briefly collect theſe Notes. Pilaſters muſt not be too tall and ſlender, leſt they reſemble Pillars; nor too dwarfiſh and groſs, leſt they imitate the Piles or Peers of Bridges; ſmoothneſs doth not ſo naturally become them as a ruſtick ſuperficies, for they aim more at State and Strength than Elegancy. In private Buildings they ought not to be narrower than one third, nor broader than two parts of the

whole vacuity between Pilaſter and Pilaſter; but to thoſe that ſtand at the corners may be allowed a little more Latitude by diſcretion for ſtrength of the Angles: In Theaters and Amphitheaters, and ſuch weighty works, *Palladio* obſerveth them to have been as broad as the half, and now and then as the whole Vacuity; he noteth otherways, and others conſent with him, that their true proportion ſhould be an exact ſquare; but for leſſening expence and inlarging of room, they are commonly narrower in flank than in front. Their principal grace doth conſiſt in half or whole Pillars applyed unto them; in which caſe it is well noted by Authors, that the Columns may be allowed ſomewhat more than their ordinary length, becauſe they lean unto ſo good ſupporters. And thus much ſhall ſuffice touching Pilaſters, which is a Cheap, and a Strong, and a Noble kind of Structure.

Now becauſe they are oftner both for Beauty and Majeſty found Arched than otherwiſe: I am here orderly led to ſpeak of Arches, and under the ſame head of Vaults, for an Arch is nothing indeed but a contracted Vault, and a Vault is but a dilated Arch.

Therefore to handle this buſineſs both compendiouſly and fundamentally, I will reſolve the whole buſineſs into a few Theorems.

Theorem 1.

All ſolid Materials free from impediment do deſcend perpendicularly downwards, becauſe ponderoſity is a natural inclination to the Center of the world, and Nature performeth her motions by the ſhorteſt lines.

Theorem 2.

Bricks moulded in their ordinary Rectangular form, if they ſhall be laid one by another in a level row between any ſupporters, ſuſtaining the two ends, then all the pieces between will neceſſarily ſink even by their own natural gravity,

vity, and much more if they ſuffer any depreſſion by other weight above them, becauſe their ſides being parallel they have room to deſcend perpendicularly without impeachment, according to the former Theorem: Therefore to make them ſtand, we muſt either change their poſture, or their figure, or both.

Theorem 3.

If Bricks moulded or Stones ſquared *cuneatim* (that is wedg-wiſe broader above than below) ſhall be laid in a row level with their ends ſupported as in the precedent Theorem, pointing all to one Center, then none of the pieces between can ſink till the Supporters give way: becauſe they want room in that figuration to deſcend perpendicularly: But this is yet a weak piece of ſtructure, becauſe the ſupporters are ſubject to much impulſion, eſpecially if the line be long; for which reaſon this Form is ſeldom uſed but over Windows or narrow Doors; therefore to fortifie the work, as in this third Theorem we have ſuppoſed the Figure of all the Materials different from thoſe in the ſecond, ſo likewiſe we muſt now change the poſture, as will appear in the Theorem following.

Theorem 4.

If the materials figured as before wedg-wiſe ſhall not be diſpoſed levelly but in form of ſome Arch or proportion of a Circle pointing all to the ſame Center: In this caſe neither the pieces of the ſaid Arch can ſink downwards through want of room to deſcend perpendicularly, nor the ſupporters or butments (as they are termed) of the ſaid Arch can ſuffer ſo much violence as in the precedent flat poſture, for the roundneſs will always make the incumbent weight rather to reſt upon the ſupporters than to ſhove them; whence may be drawn an evident Corollary, that the ſafeſt of all Arches is the Semicircular, and of all Vaults the Hemiſphere, though not abſolutely exempted from ſome natural weakneſs, as *Barn. Baldi*

Baldi Abbot of *Guaſtalla* in his Comment upon *Ariſtotles* Mechanicks doth very well prove; whence I note, That when any thing is Mathematically demonſtrated weak, it is much more Mechanically weak; errors ever more occurring more eaſily in the management of groſs materials than lineal deſigns.

Theorem 5.

As Semicircular Arches or Hemiſpherical Vaults being raiſed upon the Total Diameter be of all other the roundeſt, and conſequently the ſureſt by the precedent Theorem; ſo thoſe are the gracefulleſt, which keeping preciſely the ſame height ſhall yet be diſtended one fourteenth part longer than the ſaid entire Diameter, which addition of diſtent will confer much to their Beauty, and detract but little from their ſtrength. This obſervation I find in *Leon. Baptiſta Alberti*; but the practice how to preſerve the ſame height, and yet diſtend the ends of the Arch, is in *Albert Durers* Geometry, who taught the *Italians* many an excellent Line of great uſe in this Art.

Upon theſe five Theorems all the skill of Arching and Vaulting is grounded: As for thoſe Arches which our Artizans call of the third and fourth point, and the Tuſcan Writers *di terzo*, and *di quarto acuto*, becauſe they always concur in an acute Angle, and do ſpring from the diviſion of the Diameter into three, four or more parts at pleaſure; I ſay, theſe both for the natural imbecillity of the ſharp Angle it ſelf, and likewiſe for their very uncomlineſs ought to be exiled from judicious eyes, and left to their firſt Inventers the *Goths* or *Lombards*, amongſt other Relicks of that barbarous Age.

Thus of my firſt Partition of the parts of every Fabrick into five heads; having gone through the two former and been incidently carried into this laſt Doctrine touching Arches and Vaults, the next now in order are the Apertions, under which term I do comprehend doors, windows, ſtaircaſes, chimnies, or other conducts; in ſhort, all Inlets or Outlets, to which belong two general cautions.

Firſt,

First, That they be as few in number and as moderate in dimension as possibly may consist with other due respects; for in a word, all openings are weaknings.

Secondly, That they do not approach too near the Angles of the Walls, for it were indeed a most essential Solecism to weaken that part which must strengthen all the rest: A precept well recorded but ill practised by the *Italians* themselves, particularly at *Venice*, where I have observed divers *Pergoli* or *Meniana* (as *Vitruvius* seemeth to call them) which are certain ballised outstandings to satisfie curiosity of sight) very dangerously set forth upon the very point it self of the Mural Angle.

Before I come to the casting and comparting of the whole work (being indeed the very definitive sum of this Art, to distribute usefully and gracefully a well chosen plot) I shall collect some Notes belonging to these particular Overtures.

Of Doors and Windows.

These Inlets of men and light I couple together, because I find their due dimensions brought under one Rule, by *Leon. Alberti* (a learned searcher) who from the School of *Pythagoras* (where it was a fundamental Maxim, that the Images of all things are latent in numbers) doth determine the comliest proportions between breadths and heights, namely the Symmetry of two to three in their breadth and length, in others the double, as two to four, there will indubitably result from either a graceful and harmonious contentment to the Eye. Our Master *Vitruvius* seems to have been an extream lover of luminous Rooms, and indeed I confess that a frank light can misbecome no Edifice, yet on the other side we must take heed to make a House all Eyes like *Argus*, which in Northern Climates would be too cold, in Southern too hot. Besides there is no part of Building more expenceful than Windows, or more ruinous, not only for that vulgar reason as being exposed to all wind and weather, but because consisting of so different and unsociable pieces, as Wood, Iron, Lead and Glass, and those small and weak, and easily shaken.

Of

Of Doors there is this diſtinction; ſome were called *Fores*, ſome *Valvæ*; Thoſe, as the word may ſeem to import, did open outwards, theſe inwards, and were commonly of two leaves or panes (as we call them) thereby requiring indeed a leſſer Circle in their unfolding, and therefore much in uſe among the *Italians* at this day. But I charge them with an Imperfection, for though they let in as well, yet they keep out worſe.

Of Stair-Caſes.

To make a compleat ſtair-caſe is a curious piece of Architecture; the vulgar cautions are theſe.

That it have a liberal light againſt all Caſualties of ſlips and falls.

That the ſpace above the head be large and airy, becauſe a man doth ſpend much breadth in breathing.

That the half paces be well diſtributed at competent diſtances for repoſing on the way.

That to avoid Encounters, and beſides to gratifie the beholder, the whole ſtair-caſe have no niggard Latitude, that is, for the principal Aſcent in Royal Buildings at the leaſt ten foot.

That the breadth of every ſingle ſtep or ſtair be never leſs than one foot, nor more than eighteen inches.

That they exceed by no means half a foot in their height or thickneſs, for our legs do labour more in elevation than in diſtention.

That the ſteps be laid where they join ſomewhat ſloping, that the foot may in a ſort aſcend and deſcend together; which though obſerved by few, is a ſecret and delicate deception of the pains in mounting.

Laſtly, to reduce this doctrine to ſome Natural or at leaſt Mathematical ground, *Vitruvius* borroweth theſe proportions that make the ſides of a Rectangular Triangle; that is, three for the Perpendicular from the ſtair-head to the ground, four for the ground-line it ſelf or receſſion from the Wall, and five for the whole Inclination or ſlopeneſs in the Aſcent. There are likewiſe Spiral or Cockleſtairs, and ſometimes running about a Pillar, ſometimes vacant, wherein *Palladio* (a man very expert in

in this point) was wont to divide the Diameter of the firſt fort into three parts, yielding one to the Pillar and two to the Steps of the ſecond, into four whereof he gave two to the Stairs, and two to the Vacuity, which had all their light from above, and this in exact Oval is as a Maſter-piece. You have here inſerted the Types of ſeveral Stair-Caſes with their Ichnography; one whereof is a piece of Rarity, being a pair of double Stairs, whereon two perſons, the one aſcending, the other deſcending, ſhall not come at one another, made by *Peidro del Bergo* and *Jehan Coſin* at *Sciamburg* in *France* in the Kings Palace.

Deſcribe a Semicircle for the Ichnography, which divide in 12 equal parts, and in it deſcribe a ſmaller Cicle as at *C*. For the bigneſs of the Newel draw lines from thoſe Diviſions in the great Semicircle into the Semicircle made for the bigneſs of the Newel, ſo will that Semicircle alſo be divided into 12 equal parts; then on every of the points in the great Semicircle erect Perpendiculars, and thoſe Perpendiculars ſhall ſhew the ends of each reſpective ſtep; as the Perpendicular at 11 bounds the outward end of the firſt ſtep, the Perpendicular at 22 bounds the ſecond ſtep, *&c.* to 24, which makes good a whole Circle in the Ichnography, and Perpendiculars erected from the inner Semicircle mark on the Newels the ends of the ſame ſteps: work the ſame way with the ſteps on your right hand. The Newel is pierced through in divers places to let in light.

Of Chimnies.

The *Italians*, who make frugal fires, are not in this caſe the beſt Counſellors, therefore from them we may better learn how to raiſe fair Mantles within, and how to diſguiſe gracefully the ſhafts of Chimnies abroad; therefore ſhall lay down the Obſervations of *Phil. de l' Orme*, a man diligent in this part of work.

Firſt he obſerveth, that who in the diſpoſition of the Building will conſider the Region and the Winds that ordinarily blow from this or that Quarter, might ſo caſt the Rooms, which need moſt fire, that he ſhould little fear the incommodity of Smoke. But if the Error lies in the Structure it ſelf, then he makes a Logical Enquiry, That either the Wind is too much let in above at the mouth of the Shaft, or the Smoke ſtifled below. If none of theſe, then there is a repulſion of the Fume by ſome higher Hill

or Fabrick that overtops the Chimny; if likewiſe not this, then he concludes that the Room is little and cloſe, ſo as the Smoke cannot iſſue wanting a ſupply of Air; and ſo having a Natural Reaſon of the Cauſe, we apply ſutable Remedies.

Touching Conducts for the Suillage and other Neceſſities of the Houſe, (which how baſe ſoever in uſe, yet for the Health of the Inhabitants are as conſiderable as the reſt) I find in Authors this Counſel, that Art ſhould imitate Nature in thoſe ignoble Conveyances, and ſeparate them from ſight (where there wants a running Water) into the moſt remote, and loweſt, and thickeſt part of the Foundation, with ſecret vents poſting up through the Walls, like a Tunnel to the wi'd Air aloft.

Thus, having conſidered the *Apertions* and *Overtures* according to their particular Requiſites, I come to the Contexture of the whole work under the term of *Compartition*, into which (being the maineſt piece) I cannot enter without a few general Precautions.

Firſt, Let no man that intendeth to build, ſettle his fancy upon a Draught of the Work in Paper, how exactly ſoever meaſured or neatly ſet off in perſpective, without a Model or Type of the whole Structure, and of every parcel or partition in Board or Wood.

Next, That the ſaid Model be as plain as may be without Colours or other beautifying, leſt the Pleaſure of the Eye preoccupate the Judgment.

Laſtly, The bigger this Type is, the better; not that I would perſuade a man to ſuch an Enormity, as that Model made by *Ant. Labaco* of St. *Peters* Church in *Rome*, containing 22 foot in length, 16 in breadth, and 13 in height, and coſting 4184 Crowns, the price of a reaſonable Chappel. Yet in a Fabrick of 30 or 40 Thouſand pounds, 30 pounds may be expended in an exact Model; for a little Penury in the Premiſſes may eaſily breed ſome Abſurdity of a far greater Charge in the Concluſion.

Now after theſe Premoniſhments, I come to the *Compartition* it ſelf, by which is underſtood a graceful and uſeful Diſtribution of the whole Ground-plot, both for Rooms of Office and of Reception or Entertainment, as far as the Capacity thereof and the nature of the Country will comport.

The Gracefulneſs will conſiſt in a double Analogy or Correſpondency, Firſt, between the Parts and the Whole, whereby a great Fabrick ſhould have great Partitions, great Lights, great Entrances, great Pillars or Pilaſters; in ſum, all the Parts great.

The

The next between the Parts themſelves, not only conſidering the breadth and length, as before when we ſpake of Doors and Windows, but likewiſe their height, a point hardly reducible to any general Precept.

True it is, the Ancients did determine the Longitude of all Rooms which were longer than broad, by the double of their Latitude; and the Height half as much more as the Latitude, which Dimenſions modern Architects vary upon diſcretion: ſometimes ſquaring the Latitude, and then making the Diagonal or overthwart Line from Angle to Angle of the ſaid ſquare; the meaſure of the Height ſometimes more, but ſeldom lower, than the breadth it ſelf.

The uſefulneſs conſiſts in a ſufficient Number of Rooms of all ſorts, and their apt Coherence without Diſtraction, without Confuſion, that it may be well united, and may appear airy and ſpiritous, fit for the welcome of chearful Gueſts; about which the greateſt difficulty will be in contriving the Lights and Stair-caſes; in which reſpect the ancient Architects were at much eaſe; for both the *Greeks* and *Romans* (of whoſe private Dwellings *Vitruvius* hath left ſome Deſcription) had commonly two Cloiſtered open Courts, one ſerving for the Womens ſide, and the other for the Men, who now adays would perchance take ſo much ſeparation unkindly. Howſoever by this means the reception of Light into the body of the Building was very prompt both from without and from within, which we muſt now ſupply by ſome open form of the Fabrick, or among graceful refuges by Tarraſing any ſtory which is in danger of Darkneſs, or laſtly, by perpendicular Lights from the Roof, of all others the moſt natural: For the ſecond difficulty, which is caſting the Stair-Caſe, which is no hard point of it ſelf, but as they are incumbrances of room for other uſe, I have marked a willingneſs in the *Italian* Artizans to diſtribute the Kitchin, Pantry, Bake-houſe, waſhing Rooms, and even the Buttry likewiſe under ground next above the Foundation, and ſometimes level with the Floor of the Cellar, raiſing the firſt Aſcent into the Houſe fifteen foot or more for that end, which beſides removing Annoys out of ſight and gaining much room above, doth alſo by the Elevation of the Front add Majeſty to the whole Aſpect; and with ſuch a diſpoſition of the principal Stair-Caſe which commonly doth deliver us into the plain of the ſecond Story, there may be wonders done with a little room.

But though petty Offices may be well enough ſo remote, yet by the natural Hoſpitality of *England* the Buttry muſt be more viſible, and we need perchance for our Raunges a more ſpacious and luminous Kitchin than the aforeſaid Compartition will bear, with a more competent nearneſs to the Dining Room. It is likewiſe neceſſary to contrive a Room for a Conſervatory of the Meat that is taken from the Table till the Waiters eat, which with us by an old faſhion is more unſeemly ſet by in the mean time.

Now touching the diſtribution of Lodging Chambers, I muſt here reprove a Faſhion, which hath prevailed through *Italy*, without antient Examples: Namely, that they ſo caſt their Partitions, as when all Doors are open, a man may ſee through the whole Houſe; which doth neceſſarily put an intolerable ſervitude upon all the Chambers, ſave the inmoſt, whence none can arrive but through the reſt, or elſe the Walls muſt be extreme thick for ſecret Paſſages. And yet this will not ſerve the turn, without at leaſt three Doors to every Room, a thing moſt inſufferable in cold and windy Regions, and every where no ſmall weakning to the whole Work; being only grounded upon the fond Ambition of diſplaying to a Stranger all our Furniture at one ſight: there being another defect, which neceſſarily follows ſuch a ſervile diſpoſing of inward Chambers, that they muſt be forced to make as many common great Rooms, as there ſhall be ſeveral Stories; which (beſides that they are uſually dark, a point hardly to be avoided, running as they do through the middle of the whole Houſe) do likewiſe devour ſo much Place, that thereby they want other Galleries and Rooms of Retreat. Thus having given you general Lights and Directions, and diſcovered ſome Faults, the reſt muſt be committed to the Sagacity of the Architect, who will be often put to divers ingenious ſhifts, when he is to wreſtle with Scarcity of Ground: as ſometimes to damm one Room (though of good uſe) for the benefit and beauty of all the reſt; another while to make thoſe faireſt which are moſt in ſight, and to leave the other (like a cunning Painter) in ſhadow. I will cloſe this Part, touching *Compartition*, as chearfully as I can, with a ſhort Deſcription of a feaſting or entertaining Room after the *Ægyptian* manner, who ſeem (at leaſt till the time of *Vitruvius*) from the antient *Hebrews* and *Phœnicians* (whence all Knowledge did flow) to have retained with other Sciences in a high degree, alſo the Principles and Practice of this magnificent Art;

Art; there being no Form for ſuch a Royal uſe comparable imagined like that of the aforeſaid Nation.

Let us conceive a Floor or Area of goodly length (for example at leaſt of 120 Foot) with the breadth ſomewhat more than half of the longitude: About the two longeſt ſides and head of the ſaid Room ſhall run an Order of Pillars, which *Palladio* doth ſuppoſe *Corinthian*, ſupplying that point out of *Greece*, becauſe we know no Order proper to *Ægypt*; the fourth ſide I will leave free for Entrance: On the foreſaid Pillars was laid an Architrave, which *Vitruvius* mentioneth alone, *Palladio* adds thereunto (and with reaſon) both Frize and Cornice, over which went up a continued Wall, and therein half or three-quarter Pillars, anſwering directly to the Order below, but a fourth part leſs; and between theſe half Columns above, the whole Room was windowed round about.

Now from the loweſt Pillars there was laid over a Contignation or Floor born upon the outward Wall and the head of the Columns with Tarrace and Pavement *ſub dio*, ſaith our Maſter, and ſo indeed he might ſafely determine the matter in *Ægypt*, where they fear no Clouds; therefore *Palladio* (who leaveth this Tarrace uncovered in the middle and balliſed about) did perchance conſtrue him rightly, though therein diſcording from others. Always we muſt underſtand a ſufficient breadth of Pavement left between the open Part and the Windows, for ſome delight of Spectators that might look down into the Room. The Latitude I have ſuppoſed contrary to ſome former Poſitions a little more than half the Length; becauſe the Pillars ſtanding at a competent diſtance from the outmoſt Wall, will by interception of the ſight, ſomewhat in appearance diminiſh the breadth: In which caſes (as I have ſaid before) Diſcretion may be more licentious than Art. This is the Deſcription of an *Ægyptian* Room for Feaſts and other Jollities; about the Walls whereof we muſt imagine intire Statues placed below, and illuminated by the deſcending Light from the Tarrace, as likewiſe from the Windows between the half Pillars above. So as this Room had abundant and advantageous Light; and beſides other garniſhing muſt needs receive much State by the Height of the Roof, that lay over two Orders of Columns.

And ſo having run through the four Parts of my firſt general Diviſion, namely, *Foundation*, *Walls*, *Apertions*, and *Compartition*:

The

The Houſe may now have leave to put on his Hat, having hitherto been uncovered it ſelf, and conſequently unfit to cover others; which point, though it be the laſt of this Art in Execution, yet it is always in Intention the firſt; for who would build but for ſhelter? I ſhall now only deliver a few of the propereſt, and (as I may ſay) naturalleſt Conſiderations that belong to this remaining Piece.

There are two Extremities to be avoided in the Cover or Roof, that it be not too heavy nor too light, the firſt will ſuffer a vulgar Objection of preſſing too much the Under-work. The other containeth a more ſecret Inconvenience, for the Cover is not only a bare Defence, but likewiſe a kind of Band or Ligature to the whole Fabrick, and therefore would require ſome reaſonable Weight; but of the two a Houſe top-heavy is the worſt, next, there muſt be a care of Equality, that the Edifice be not preſſed on the one ſide more than on the other. And here *Palladio* doth wiſely adviſe that the inward Walls might bear ſome good ſhare in the Burthen, and the outward be the leſs charged. Thirdly, the *Italians* are very careful in giving the Cover a graceful Pendence or Slopeneſs, dividing the whole breadth into nine parts, whereof two ſhall ſerve for the Elevation of the higheſt Top or Ridg from the loweſt. But in this point, the quality of the Region is conſiderable; for as our *Vitruvius* inſinuateth, thoſe Climes that fear the falling and lying of much Snow, ought to provide more inclining Pent-houſes, and Comelineſs muſt yield to Neceſſity.

Thus have you briefly laid down, from the beſt Authors, the Ground-Rules of the Art of Building; which being well conſidered, may be of great uſe to the ingenious Architect in the managing of any Royal or Noble Deſign.

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